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and
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and
University of Illinois
Office of Continuing Education and Public Service

CATV AND ITS IMPLICATIONS FOR LIBRARIES

edited by
CORA E. THOMASSEN

University of Illinois
Graduate School of Library Science
Urbana-Champaign, Illinois

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CONTENTS

INTRODUCTION	1
CORA E. THOMASSEN	
LIBRARIES AND CATV: SOME HOPES AND FEARS	3
DONALD P. MULLALLY	
WHAT THE INDUSTRY CAN OFFER: THE NEXT COMMUNITY NETWORK	13
JAMES S. KELLER	
FRANCHISING PROBLEMS AND PROCEDURES IN CATV	24
DONALD P. MULLALLY, JAMES S. KELLER AND EDWARD F. DOUGLASS	
CATV AS A MEDIUM FOR INFORMATION ACCESS	38
BRIGITTE L. KENNY	
POTENTIALS OF INTERACTIVE CABLE TELEVISION	52
LAWRENCE W. KATZ	
CABLE TELEVISION AS AN INFORMATION TOOL	66
KEN DOWLIN	
THE VIDEO POLICY STATEMENT	70
ROBERTO ESTEVES	
A PUBLIC ACCESS WORKSHOP	78
BOBBY MARIANO	
CATV AND LIBRARIES: ISSUES AND CHALLENGES	81
RUSSELL SHANK	
INDEX	91



INTRODUCTION

The nineteenth Allerton Park Institute was held November 11-14, 1973, at Allerton House, Allerton Park, Monticello, Illinois. This Institute was co-sponsored by the Illinois State Library, the Graduate School of Library Science of the University of Illinois and the University of Illinois Office of Continuing Education and Public Service.

The conference theme centered on the implications of cable television for libraries. The general purpose of the Institute was to foster greater understanding about the subject of cable television in the conference participants. More specifically, the planning committee for the conference enumerated the following objectives:

1. to provide an atmosphere of inquiry focused on the implications of cable television for libraries;
2. to provide consultants and resource people who have knowledge and experience related to the potential of cable television and its implications for libraries;
3. to expand the participants' understandings and perceptions of the technology of cable television and its related equipment as they affect the libraries' communications responsibilities;
4. to suggest some techniques for utilizing cable television in originating local programs, and to explore the possibilities for the varieties of services cable television can offer the profession;
5. to aid librarians in all types of libraries to become aware of the unique possibilities for the utilization of cable television in their specific types of libraries, and also to suggest the importance of cable television in a systematic approach to library and information networks; and,

6. to create a growing and continuing consciousness of the problems and opportunities for the utilization of cable television in libraries.

The Institute participants represented all major types of libraries and came from many parts of the United States and Canada. Representatives from other parts of the world were also in attendance. Significant to the State of Illinois and its growing concern for continued expansion of library communications, was the attendance of representatives from each of the public library systems in Illinois, as well as personnel from the Illinois State Library. A great deal of interaction took place during the conference among the conference participants, resource persons, speakers, and consultants. Discussions, questions and answers, panel presentations, opportunities for sharing materials and videotapes and for actual experience with unsophisticated video equipment were activities in which participants engaged. Major sessions of the conference were videotaped and the entire conference was transmitted through a closed-circuit television system to other areas of the conference center.

Not represented in these papers, but a part of the conference activity, was a demonstration of the University of Illinois PLATO system, by Donald L. Bitzer, Director of the Computer-Based Education Research Laboratory. The implications for interfacing this or similar computer-based systems with other communication devices was explored. Another session of the Institute was devoted to a panel discussion by Arlita Austin, Sella Morrison, Stephen Moskal, Lester Stoeffel, and chaired by Kathryn Gesterfield, all Illinois librarians concerned with the directions of cable communications in library activities in the state.

The papers in this publication represent the edited oral presentations of the speakers at the conference. Many of their presentations were accompanied by videotapes or other visual resources, some of which were unable to be reproduced here. The committee hopes that these published papers will be an aid to librarians exploring the implications of cable communications for expanded and efficient library service. The conference planning committee was made up of Kathryn Gesterfield and Travis Tyer from the Illinois State Library; Kathryn Henderson, F. Wilfrid Lancaster and Cora Thomassen from the Graduate School of Library Science; and Donald Mullally, Director of Broadcasting, at the University of Illinois, Urbana-Champaign.

CORA E. THOMASSEN
Editor

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Libraries and CATV: Some Hopes and Fears

I have been trying to decide what it is that librarians do, and I see that the traditional role of librarians has changed greatly. They are no longer merely the custodians of shelves of dusty books, the shushers of small children, the sorters of cards, and the extorters of fines from miscreant bookborrowers. If we examine the full range of their activities, the only thing we can say is that they help people get access to information, help people find new ways of enriching their lives, and play a large role in community development. Some librarians administer systems that serve these ends, which may be just another way of saying that libraries, like universities, are cultural and educational institutions, and those institutions may, in the long run, turn out to be among the heaviest users of CATV.

Figure 1 is a picture of a CATV system, which I will explain somewhat superficially. Over-the-air television signals are captured by the array of special antennas, and are sent to the headend for processing or "cleaning up"—the interference is removed, the color balance is corrected, and all channels are brought to the same level of strength. Other signals are delivered from distant cities by microwave, and are processed in the same way.

Also at the headend are studios and other program sources which are fed onto the main line, or trunk. Periodically, amplifiers bring the signal back up to strength. No subscribers are connected directly to the trunk line. Instead, a sample of the signal is fed into a bridging amplifier which takes the signal from

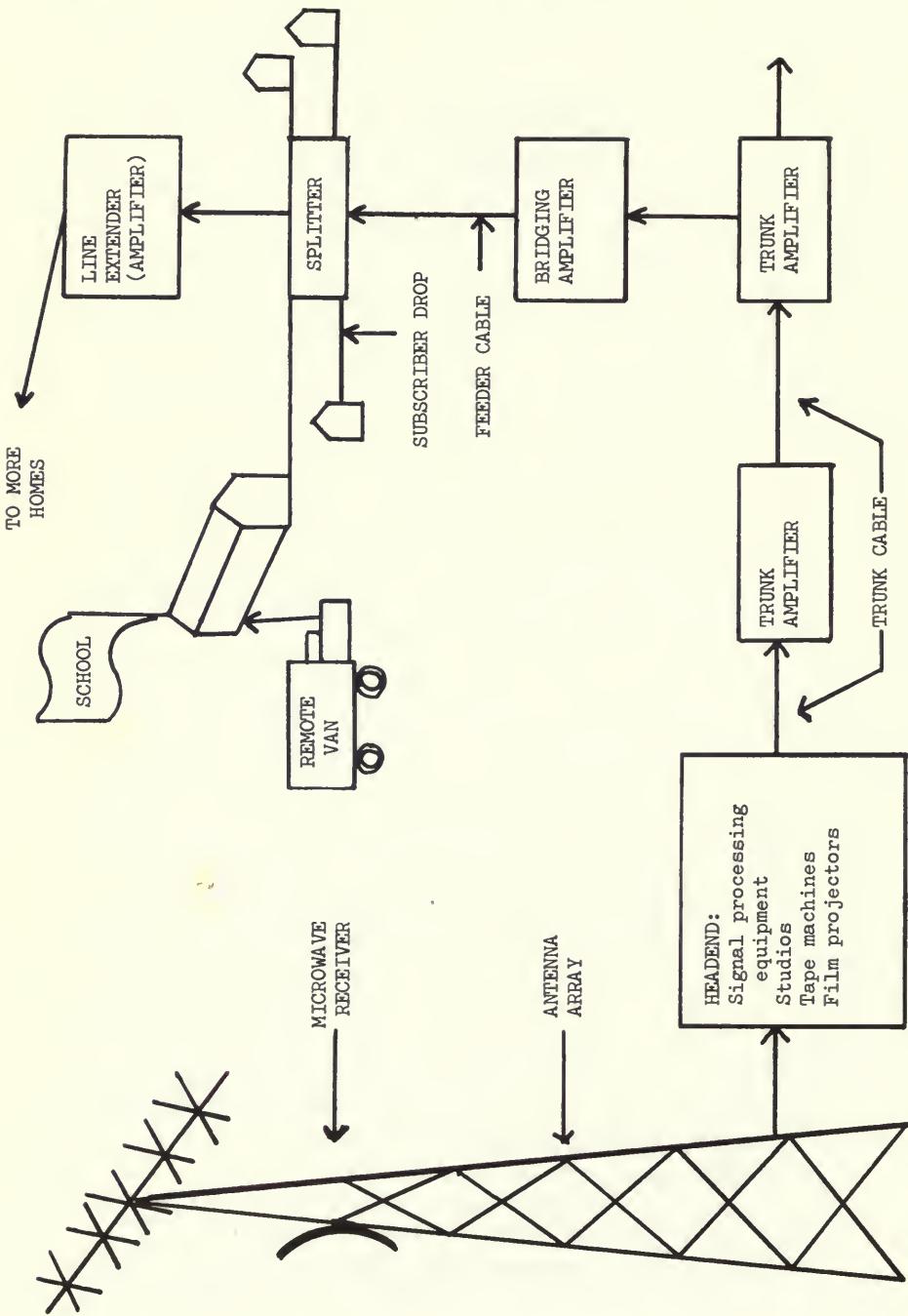


Fig. 1. CATV System.

the trunk onto the distribution or feeder cables. Ultimately, somewhere in each neighborhood, the signal is fed into a splitter which usually divides it into four separate feeds which lead to the subscriber's house through a "subscriber drop." At the end of the cable leg some companies use line extender amplifiers, although the number of amplifiers in a "cascade" should be held to a minimum.

If this is a two-way system, signals can be originated at many points on the system, fed back to the headend, and then out on another channel to everyone on the system.

What does this have to do with libraries as educational and cultural institutions, and with those of us who are in the business of public education—in the broadest sense of that word? Frankly, I am quite hopeful that CATV will have a profound effect upon education and a very positive effect upon society as a whole, although that attitude may sound too optimistic.

In the early 1920s David Sarnoff and Lee DeForest predicted that radio would bring education and culture into every home. In general, radio has not lived up to this expectation; for the most part it has become an electronic jukebox, a communicator of one-minute capsules of nonnews, and above all, a super-salesman for the sponsor's products.

Having failed with radio, there were, in the 1940s, predictions that television would cure our educational ills; but it has not. Dozens of experiments with educational television have come to almost nothing, despite millions of dollars of support. *Public* television, a somewhat different concept, will probably come to almost nothing; it is being strangled for lack of funds and whipsawed by politicians who would prefer a greater measure of control over the content of this occasionally brash and irksome medium. And, with rare exceptions, *commercial* television has become a pipeline of pallid humor, a way of escaping from reality rather than exploring it, and above all else, a tasteless salesmedium for bad breath remedies, sprays for armpits and genitals, cures for hemorrhoids and headaches, and a thousand other products. Indeed, it is evident that television, like radio, has met neither our hopes nor our expectations as a medium of education and as an instrument for social progress. Given this history, how can one expect something different from CATV?

CATV, or cable television as some call it, began as a means of delivering television programs to isolated communities: an antenna was erected atop a mountain, and wires were strung to the homes below, often along fenceposts, through ditches, and occasionally tacked to telephone poles. Today, CATV is much more than that; we now think of it as a sophisticated broadband two-way total communications system. Right now, nearly one family in ten throughout the country is attached to a cable system, and the growth rate is exceedingly high. Although the technology is now much more sophisticated than in the early days, there are many basic similarities: somewhere in the community there is erected a specially designed array of antennas. Sometimes, television and radio

programs from distant cities are microwaved to this tower. The signals are then processed or "cleaned up"—missing picture elements lost in the transmission process are restored electronically, and a strong, crisp signal is sent throughout the community by means of a network of coaxial cables. Amplifiers in the system keep the signal strong and interference-free.

Usually the system operator will maintain one or more studios from which he can originate programs, either live or on film or tape. And, by law, there must now be "public access" studios—a kind of electronic soapbox which any member of the public may use to address, free of charge, anyone who will watch and listen.

If this were all, one could conclude that cable television is very little different from over-the-air broadcasting, and would not see much hope for a significant impact either on education or on society. But there is a great difference.

If one carefully analyzes the reasons why commercial broadcasting has evolved into the kind of medium which is described earlier in such unkind terms, one will find that broadcasting is tied to the unrelenting tether of advertising for its support. This economic structure forces broadcasters to seek ever-larger audiences, for, generally speaking, the larger a program's audience, the more valuable it is as a commercial vehicle. By the same token, maintenance of a large audience requires rigid adherence to the successful formula—experimentation with bizarre (or, as some like to say, "creative") types of programming cannot be tolerated. Finally, because profits are an important consideration, programs must not only attract the largest possible audience and generate a maximum amount of revenue, they must be produced as cheaply as possible. But broadcasters have discovered that it is *not* possible to cheaply produce shows featuring name stars and slick, glamorous locations. So, bowing to the inevitable, they willingly spend \$150,000 an hour for a series of twenty-two prime-time programs, and plan on running each show at least twice during the year. Later, after the program has finished its network run, it will be sold in syndication to local stations and overseas—to mislead the viewers in developing countries about the American way of life. In nonprime-time, game shows and soap operas fill the airwaves very cheaply. The net effect is a sameness, for if a program is to be economically successful in several hundred markets, in a dozen time slots over a period of years, it must be inoffensive and bland. For the advertiser's sake, it must not arouse or anger, it must not deal with socially troubling topics, and, preferably, it must be a bit funny. Certainly, if it touches a social nerve, it must not do so seriously. We call this *broadcasting* because that is its aim—appeal to the broad mass audience.

The difficulty with this concept is its inevitable result: the majority is served at the expense of a sizable minority. The minority is not just the opera buff or the drama fan, although they are important. I am talking of the model airplane builder, the computer programmer, the antique collector, the amateur

photographer, or the retired person who needs information on social security benefits or geriatric nutrition, or even knitting lessons. The Black, the Chicano, the woman, or even the librarian—these people who are a part of the mass audience are also members of unserved minorities! The broadcaster cannot afford to program to these minorities: he has but a single channel which must serve the majority, and he must serve that majority at a profit generated by mass advertisers.

Thus, we come to the two important truths about commercial broadcasting which—even if we ignore the foibles of the people who control the institution—will account for the fact that broadcasting has not met our expectations: (1) it depends upon mass advertising and mass audiences; and (2) it operates in an environment of scarcity—there are limited numbers of stations, and each must scramble for the largest possible audience.

Significantly, neither of these constraints applies to CATV. At this time, the main source of revenues for CATV systems is subscriber fees. Five or six dollars per month is not an outrageous amount to pay for CATV service on the basis of ordinary television entertainment: one gets perfect color pictures, equally strong on all channels, with more stations than one could get even with a very sophisticated and costly home antenna; one gets a number of other programs originated by the system itself; and one does not have the cost and aggravation of buying, installing, and maintaining a makeshift rooftop antenna which may blow down during a storm. In short, a CATV system is supported by its subscribers. Of course, the programs are essentially the same as those seen on over-the-air television, and the commercial messages are still there.

We must also consider the second point: CATV does not operate in an environment of scarcity. The coaxial cable is a wonderful thing, for it will carry virtually an unlimited number of different signals simultaneously, and in both directions at once. These can be any mixture of television signals, audio or radio signals, and data signals. While most early CATV systems were capable of carrying five or even twelve channels into every home, modern systems are commonly built for twenty or thirty-six channels, and there have even been experimental fifty and 100 channel systems built. In summary, subscriber revenues which are derived from the use of a relatively small number of channels for entertainment television programs will support a system capable of providing dozens of other educationally and socially useful services.

A few examples of how CATV might be used in a typical community in the near future might be useful:

Public meetings could be televised—if one were so inclined, he or she could watch the city council or the board of education at home.

Schools could expand their adult education offerings to include videotaped lessons on almost any subject.

Schools could use the two-way capability of CATV for the teaching of homebound students. One experiment has shown that if homebound students

can see and hear each other and their teacher, and know that they can be seen and heard, their interest in education and in their own physical improvement increases. Schools have discovered that they can teach four or five times as many homebound students with each special teacher.

Libraries can bring their product—their services—right into users' homes, even to the disabled and the aged who might have difficulty getting to the library.

Computer-assisted instruction could become much more common: units similar to those utilized by the PLATO system at the University of Illinois could be placed in schools and homes, with the signals being transmitted at very low cost by the CATV cable.

Security could be increased in major cities: fire and burglar-alarm protection could become a reality for every homeowner.

Community groups could become more integrated as they receive—and produce—television programs of special interest: it is possible to send a discussion of a zoning change, for example, only into the neighborhood directly concerned.

Because it is quite inexpensive to produce programs for CATV, all community groups could offer their input to the community as a whole.

What of the minorities mentioned earlier—the opera or drama lover, the model airplane builder, the older person with a need for special information, the person who enjoys local news—how are they to be served?

A good example concerns the model airplane builder, because I suspect that in many communities there may only be a score of avid practitioners. Will they ever be able to see a series of programs about how to build models on broadcast television? I think not; no one will sponsor a program to reach only twenty or thirty people in a community, and no station would risk the loss of the rest of its audience. But it is possible that the maker of airplane glue might see the value of reaching all the airplane builders in the country. The glue company might commission the taping of a series of programs on model building and send these tapes to every cable system in the country. If they reach 20 people in Champaign, 50 people in Springfield, 500 in Chicago, 12 in Danville, 1,000,000 across the country—all potential buyers of the sponsor's product—it can be a good advertising buy.

But will the cable operator run the program—and give away this advertising time? Indeed he will! He has a dozen unused channels, and he knows that the wider the variety of his programs, the more people will sign up for his cable system. By this means, he will increase his income. And by this means, the twenty people who like to build models or hear about new books and library resources will be served. Similarly, the lover of drama or music will find his needs fulfilled, the person who wants education can get some, and the broader needs of a wide range of people can be met. This is not *broadcasting*. It is *narrowcasting*.

The concept of reaching a limited audience has already been proven. There is a reason why *Intellectual Digest*, *Popular Photography*, *MS*, *Ebony*, *Modern Crossword Puzzles*, *Public Opinion Quarterly*, *Foreign Affairs*, *Road and Track*, and *Jack and Jill* have survived and prospered while *Colliers*, *The Saturday Evening Post*, *Look*, and *Life* have failed. Broadcast television has become the equivalent of the mass circulation, general audience magazine. It is possible that CATV can become the electronic equivalent of the special interest magazines.

CATV will soon be coming to Urbana-Champaign and the University of Illinois, and I would like to outline some of our hopes and plans. The local system will be constructed as though it were three separate but interconnectable systems—one serving Champaign, one serving Urbana, and one serving the University of Illinois campus. This plan offers an unusual degree of flexibility and a number of interesting possibilities for instruction, research, entertainment, and service to the community.

On the campus, the plan is to have a terminal in every classroom building, and these will be connected to the closed circuit television wiring in buildings where that now exists. Thus, our two-channel closed circuit system will be replaced with a sophisticated CATV system offering twenty-seven channels in the forward direction and three in the reverse direction, with service immediately available to dozens of classrooms, and potentially available to all classrooms.

Virtually all office buildings will be connected to the system, as well as laboratories, the central receiving warehouse, the intramural physical education building, the assembly hall, the auditorium, and virtually every other building.

Every dormitory room, every apartment in married students' housing, and every student-staff apartment will be wired. All of these living areas will be connected to the campus system, and it will be possible to originate or to receive signals from every single point on the system.

How could we use this system for instruction? Let us consider lectures from the student's point of view. What goes on at the typical lecture? Information transfer. In large lectures, the students sit bunched together like so many cabbageheads being filled up with information. There is no chance to ask a question, no chance to start a discussion, nothing but an overheated, cramped, poorly ventilated lecture room in which it is often difficult to hear and see the instructor. To get to this hour of torture, the student often arises at the crack of dawn and trudges through snow or rain. One can see that technologically, with CATV, it would be no trick to put the lectures on television so students could watch comfortably at home.

Would students like this? We conducted a random-sample survey to find out. We discovered that almost 70 percent of the undergraduates in University of Illinois dormitories are enrolled in a lecture section of more than 150 students. We asked all of them to imagine that in a lecture-recitation class, the lectures were available both in the classroom and on television in their rooms—

and small recitation groups were retained for more personal interaction. Television lectures would be repeated several times during the day and night. We then gave them a number of alternative choices regarding attending the class or watching it on television: 41 percent of the students said they would always or usually watch it on television; 52 percent would watch it on television if it were inconvenient to go to class.

If tapes of in-class lectures were shown several times later in the day and night, 85 percent of the students said the opportunity of a second exposure would be helpful.

You can see that there are several levels of sophistication possible: we might merely look in, via television, on a typical lecture; or we might just tape the lecture in a studio (and if it were done especially for television, it might be much better) and play the tapes repeatedly. If the lectures were substantially prerecorded, the faculty member would have more time to work individually and in small groups with students.

We asked our survey respondents whether condensed versions of the major points of a lecture, for students to view at home as a supplement to the in-class lectures, would be helpful. Seventy-eight percent of the graduate students and 91 percent of the undergraduates said it would be helpful.

This kind of use just scratches the surface of the instructional possibilities. Educational films and slides could be shown to students in their rooms. Lecturers from other institutions could be microwaved into their midst. Students could tune into samples of disciplines other than their own for a much broader exposure to the educational experience.

How can we serve the two-thirds of our students who do not live on campus? We have arranged for the use of three channels on the CATV systems which will go throughout the communities. Thus, programs being shown on campus can be sent throughout the community—not only to students, but to everyone who might be interested in more exposure to the educational possibilities of the University of Illinois, its library, and its other facilities. This would be truly free education from a university without walls. With the interconnection of CATV systems in other cities, this could become a statewide center for free higher education. If distant students desire credit, this could be arranged through the extension service.

On campus, it is our plan to interconnect six or seven computers via the CATV system for more efficient computer service. These cables make possible the location of computer terminals or PLATO terminals virtually anywhere on campus or in the Champaign-Urbana area.

Consider the possibility of computerizing the card file at the library, and computerizing the check in/check out function. Then, from his home, one could browse through the card file, select a book, and determine if it is on the shelves or checked out by another person.

For anyone interested in what the University of Illinois might do after it embraces the cable, a mimeographed paper on the "Possible Uses of CATV at the University of Illinois, 1973-1980" is available.¹

I want to sound a note of caution. While CATV may indeed have a profound effect upon society and has great potential for use in education, there is a great possibility that this medium, like radio and television, will come to almost nothing.

There are two insidious forces which concern me greatly. The first is economics. It is now in the economic interest of cable operators to serve a wide variety of interests and to make the cable a socially useful medium. But times will probably change. It seems that it is the job of opinion leaders, of those who have some concern for the future, to exert the appropriate pressures to see that it will always be in the economic interest of cable operators to serve the public well. This is another topic in itself, but, in short, it involves understanding the economics of the cable industry and manipulation of the incentives to good service by city governments, as well as pressure upon the federal government to support and encourage socially useful activities by cable operators.

The second of the insidious forces is inertia. One can see that—with regard to education at least—it is much easier to continue as we are than it is to change or to innovate. In this respect, the University of Illinois is quite fortunate: its administration has been wise enough and foresighted enough to perceive the possibilities offered by cable and to act decisively at the only moment when it is possible, so to speak, to get a piece of the action—at the time franchises are being let for the Urbana-Champaign market. Unfortunately, most universities have failed to perceive the possibilities of this new technology, and have let that moment pass. Others have perceived the utility of cable, but have not devoted their energies to getting a commitment from the cable industry, either through ignorance of how to go about it, or because of timidity and a failure to realize that a university—or a library—can offer assets to the cable operator. Even here it is difficult to predict how much inertia—and a whole complex of incentives and disincentives—will affect the desire of students, faculty and ordinary citizens to make optimum use of this new facility.

Thus, we must conclude that CATV has great possibilities both for education and for social progress, but if these possibilities are to be transmogrified into realities, we must be prepared to control the economic incentives and to overcome the forces of inertia.

In the long run, it should be librarians who decide how libraries can best use these new technologies to increase their service to the public.

I want to sound another note of caution: do not be impressed with technology for its own sake. Before you commit yourself to a new technology, be sure that it will really do a better job than some of the other technologies available, or that it makes it possible to do a job *you* really should be doing.

REFERENCE

1. "Possible Uses of CATV at the University of Illinois, 1973-1980." Available from: Department of Radio and Television, University of Illinois, 119 Gregory Hall, Urbana, Ill. 61801.

JAMES S. KELLER
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What the Industry Can Offer: The Next Community Network

The topic assigned to me was "What the Industry Can Offer"—an impossible topic to discuss because the industry is currently made up of such diverse viewpoints. My own company, which is the fourth largest cable television company in the country and has facilities in 116 cities, is undergoing a major transitional stage. The communications technology being developed now is limited only by our imagination. So I tried to subtitle my speech and came up with the following: "What does industry offer, what can it offer the library?" which is a variation of "How do you see your profession?" which led to "What is a library?" Others were "How much do you need, how soon?" "Is a depository enough?" "The society's convenience and the need to know," "The medium of plenty or the medium of waste," and, of course, "The communications revolution" or "How to compete in the communications explosion," "When we do what we can do, what can you do?" "Community information center," or "The library as a community resource center."

I finally settled on the subtitle: "The Next Community Network." I made my final decision only after discussing with librarians what the ramifications of libraries are going to be. At the risk of being presumptuous I asked a number of librarians what business they were in. I had two astute answers: communications and service. The first, I think, is primarily what cable and the library is all about—communications. Secondly, libraries are in the service business. In the society of convenience it is no longer possible for librarians to expect people to come to them to view their wares. It is now imperative to take the library's

facilities to the community. This can be done by a broadband or a cable communications system.

Earlier, I may have used the term cable television. That is the last time I will use it for the following reasons. There was, for a generation, an industry originally known as CATV, or Community Antenna Television, which started in small communities and in the hills around the country in Pennsylvania, Oregon, the mountains of Colorado, etc., primarily as a reception service to areas that could not receive any television at all. About seven years ago, the Federal Communications Commission permitted CATV to begin programming and carrying sources of programs other than off-the-air broadcasts. This became known as community or cable television. Today, with the capabilities of our new plants with total two-way capability, it is possible to carry any signal which can be reduced electronically or anything that can be reduced to an electronic signal. We have the capacity within the band width of one television channel, to carry ✓ 2,000 data channels. The systems have the capability of originating at any point on the system.

For the above reasons, comparing what CATV was five years ago to what it is today is analogous to comparing railroads and airlines. Both are transportation, but the systems that were built five years ago are the railroads, and the systems being built today for broadband communications industry are the airplanes. The broadband communications industry has, in the last five or six years, probably become the most studied communications industry of all time. If the telephone had been studied prior to the time that it was put into service as much as cable communications has been, we might still be communicating with tin cans and a string. Everybody is telling the cable communications industry what great uses can be made of its systems. The cable communications system can, however, only provide the pipeline for the educators, for city government, for business, and for the public. It cannot, nor does it want to, control the input from these sources. There is a tremendous potential for information, which does not yet exist in any community.

Libraries are a source of education, information, and entertainment. A wedding of the current cable communications technology and the library's capability for disseminating information has great potential. Although libraries were established in the very early history of the United States, they were already obsolete in some respects at the time of their institution. One institution that had the edge on libraries was the town crier, because the town crier had mobility. He could move to where information was needed. The library first had a book depository in one place and, to provide mobility, it established branch libraries, and then mobile libraries. The next step in this progression of taking the information to the people can be the community cable communication system.

Some consider that we have already gone from a print-oriented society to a verbal or broadcast-oriented method of communicating. With this change,

libraries can be the community communications resource center with direct distribution of all kinds of visual information. Hopefully in the future this will include random access to a library's microfilm collection and other films. This can be done on a sporadic basis right now, but the technology necessary to allow anyone in the community to have random access is not currently available.

With the universities and the elementary and secondary systems tied into ✓ one network with the public library, the information resources will be greater and capable of more efficient utilization. This kind of future could make the library the provider of information for millions of homes. However, if libraries remain book warehouses, and librarians remain index clerks, the cable communications industry will have little effect on them. But if librarians accept the responsibility for a true communications resource center, the cable communications industry can provide the access both to and from the library. If librarians want such a cable system, they should find out what the capacity of the system in their community is. If there is none, local politicians must be motivated to get one, with the library's input, and then administrators must be motivated to gear up for the uses that can then be provided. Film chain, slide projector, microfilm and microfiche all can be interfaced with the communications system. Many libraries have such audiovisual aids now, and with a few thousand dollars that equipment can be interfaced with the cable system in those communities.

QUESTIONS AND ANSWERS

- Q. When a community is wired, what percentage of potential subscribers does the industry anticipate, or is it experiencing?
- A. In established systems, we are reaching between 50 and 70 percent saturation, because these are communities that do not have adequate television services—either in quality or quantity of broadcast signals. In newer markets, we estimate reaching 50 percent saturation in five years. We are estimating 60 percent saturation in Urbana-Champaign in five years. If we include all the students, and we are wiring over 5,000 dormitory units on campus, we will probably be near 65 to 70 percent saturation in Urbana-Champaign in the next five years.
- Q. Do all cable communications have two-way capability?
- A. All of the systems we are building now or have built in the last two years have this capacity, and anything that we will build in the future will have it. This is a good question—there is controversy in the industry today as to whether two-way communications are possible. They are—in our Orlando, Florida, system we are experimenting with such things as home shopping, remote surveillance of banks after hours, remote traffic surveillance, and

automatic polling. We are connecting the Orange County Library System with all of the schools and colleges in Orange County.

- Q. Are there any municipally owned cable communications systems?
- A. Yes, there are some examples of public financing; I feel most of them are bad. San Bruno, California, is perhaps the most notable. They use water revenue bonds to finance the cable television system, and after five years, approximately one-half of the system is built. The city has petitioned the FCC for a waiver of the local programming capabilities of the system. The water system has left much to be desired; there are many people who do not feel that San Bruno is doing very well. Philosophically, there are all kinds of arguments about it, and I do not want to go into them. Economically, it is a disaster.

There are many other things that the public dollar should be doing than financing a speculative enterprise, as long as private capital will do it. The issue of public funding of CATV is nothing but a lot of smoke. The cable communications industry has, from the beginning, been fighting some of the most powerful lobbies in the country—the telephone company, broadcasters, and newspaper publishers. These are the existing communications monopolies, and we feel that the establishment of this broad capability of a new communication system is going to break the hold of the existing communications monopolies. But there are so many of what I refer to as protest groups throughout the country, some sincere and well intentioned, raising so many issues that they are confusing the entire issue and playing right into the hands of the existing communications monopolies. These monopolies are going to make it more and more difficult for new systems to be built—systems that are going to provide the kind of service that we cannot get while the existing communication monopolies are still in existence.

- Q. Doesn't the system operator become a programming monopoly?
- A. In some ways that is correct, with this exception: the only monopoly being established is one of financing the building of the system. Of the thirty-five or more channels that we are discussing, the operator will have control of only one, the other programming sources will not be under his control. This is especially true of the channel reserved for public access, what we refer to as the soapbox channel. I think that in general the FCC thinks that it is better to get people standing up before the camera than going down to city hall to throw rocks. But the input from public access cannot be controlled by the operator, or by anyone. By law, we cannot discriminate or censor. In the same way, we have no control over any programming source, e.g., the library. So we are providing a monopoly only in the fact that we have the wire.

- Q. What reasonable assistance in terms of hardware and software, or technical capability and technical assistance, is the industry willing to provide?
- A. I can only speak for our company. First, we believe we can assist in getting grant money: there are some HEW funds, and there are some private foundation funds for hardware and sometimes software for pilot programs on the use of cable. In addition, the system operator's programming people can assist via classes, on the use and maintenance of the equipment, and the fundamentals of sound programming. In most cases, we would be willing to provide the interfacing equipment to the system. We do not now, nor do we ever intend to actually provide the input because we are not librarians, educators, or data processors. We provide the pipeline responsible for the maintenance of that system. For many of our systems we provide the use of mobile van facilities and studio facilities for community groups until they are able to obtain their own equipment. We provide the facilities for public access, and we will provide, in most cases, the channel capacity for getting into the system and into the homes.
- Q. In the large metropolitan areas, how quantitative will the introduction of cable television be?
- A. With few exceptions, I think our penetration in the very large markets (those ranked in the top 25) is going to be small unless we are able to pinpoint the kind of service that these people are willing to pay for. In the experiments in Orlando, Florida, mentioned earlier, we need to know whether we are going to be allowed to provide pay television on one channel and whether businesses are going to look for an alternative source to the telephone company for providing data interconnection. These are questions that we really cannot answer and one reason why we are going so slow in the top markets. We cannot do anything that would not be economically feasible—e.g., to wire Chicago on one hand, or Tucson, Arizona, on the other, would not be economically feasible. Denver and Dallas might also be very difficult markets for us to penetrate; I believe it will be five to eight years before those markets will be built.
- Q. What is required to interconnect systems in adjoining communities? Is it being done?
- A. It does not necessarily require a separate reserve channel for interconnecting these systems. Urbana-Champaign and the University of Illinois can be interconnected both technically and from a program capability just by the nature of their being contingent. To interconnect all systems within a state would probably mean going to some kind of point-to-point transmission facility, microwave facility, or satellite interconnection system. This will be done and is being done more and more. We are currently

putting together a network in North Carolina which will service only the cable system, and we now have eighteen communities within Orange County, Florida, that are interconnected. The problems are not technical for the interconnective system.

- Q. When might rural communities receive cable communications service?
- A. I have no idea when rural communities will receive service; that is one reason we need over-the-air broadcasting in the future. It is simply not economical to string cable in rural communities. When we talk of building a cable plant we are considering a capital expenditure of \$10,000 per mile. There have been some exploratory bills introduced in Congress to provide low interest rate funds for providing this service, much as they are provided for the rural telephone companies and electric companies. This will probably come only in the far distant future—primarily because the broadcasters will resist this strongly.
- Q. Will the cable companies guarantee the numbers of channels to be included in a system and those to be used for educational purposes?
- A. Fortunately the FCC has already addressed itself to this question. By 1977 all systems within the top 100 markets must meet the new FCC requirement—a minimum channel capacity of twenty, the technical standards as set up by the FCC, the access channels, the one channel reserved for every channel off the air, etc. The communities, the smaller markets outside the top 100 market area, must be certified at that point, which will give the city councils an opportunity to open up these franchises. As a result, a local mandate by the franchising authorities will require most of the smaller communities to meet the FCC standards. I believe it will start before 1977, but by 1980 they will all be in compliance.
- Q. Will other advancing technologies, such as lazers, be economically and technically feasible as carriers for communications signals?
- A. The lazer, in our opinion and the opinion of the engineers, is going to be a tremendously useful tool. But it is going to be useful more on the basis of the point-to-point transmission, taking the place of microwave or satellite for distribution. We can harness the lazer within what we call a “wave guide” and hang this on the poles and shoot that lazer down. It is very difficult to remove the signal every fifty or sixty feet in order to get it into the homes. The advancing technologies are going to be a part of a total telecommunications policy. We do not feel that the cable is going to be the only communications means, but we do feel that we are going to play a very important part in the distribution of information.

- Q. Do you think there is going to be a place for satellite-to-home transmission in the new cable communications set up?
- A. Yes, but I think it is going to be limited. For the same reason that there are not more than four or five television stations in one community, and they are never adjacent, there cannot be more than three to five signals directly into the home from the satellite, and certainly not the multiples that we have been talking about. But I do very definitely think that there is going to be a place for satellite-to-home transmission in the rural areas.
- Q. Do you also refer to the Chicago suburbs, when you say it is not currently feasible to consider providing cable communication to Chicago?
- A. Because of the tremendous capital investment required in the city of Chicago, much of which is underground construction in concrete, and also because of the current existing broadcast capability within the city, and because of the political climate, I think it will be very difficult to operate a cable communications network within Chicago. In terms of things happening in the suburban communities, we have a catalyst in the Sears Building; signals are bouncing off of it all over the place right now, to the point where some people within four or five miles of a transmitter are not receiving good pictures. Even when the transmitters are put up on top of the Sears Building there are going to be signals bouncing off other buildings in Chicago and isolating good reception for some of the suburban communities. I believe many of the suburbs will have cable communications networks before the city of Chicago itself.
- Q. You said both that your company is providing experimental types of service and information—surveillance, home shopping, etc.—and also that you will only have one channel for two-way communication within a system. What can the library expect?
- A. Because we are in a pilot program we are currently doing input as well as the transmission system itself to prove that it is technically feasible. To handle the kinds of communication that have been discussed and to motivate the use of them by the hospitals, municipal governments, public access groups, etc., means we have to wear both hats for the present. Any cable operator who is currently building in a major market would be more than happy to provide users with the channel capacity now only used on an experimental basis if users were able to provide the internal equipment, since suppliers will not initially provide that.
- Q. What requirements does a library need to meet to gain access to a channel?
- A. A library must have some originating capability. It can be as simple as a

slide projector, a camera, a film chain, or a videotape recorder. You could start with only a character generator.

- Q. What does access actually include?
- A. Access is a term that was coined by the FCC in the rules of March 1972. The FCC says a cable communications system must provide free access under certain basic conditions. We must provide channels for public access (soap box channel), for municipal access (access by the city), and for educational access. However, the FCC went a step further and said that no city, at least during the experimental period, could require that more than one channel be donated to public, educational, or municipal access, unless the city could show that these channels would be utilized and that they are absolutely needed. An example of this is the University of Illinois where, in addition to providing the access channel to the schools, they are providing three channels from the university into both the communities of Champaign and Urbana. This exceeds the FCC requirements, but we believe, along with the university, that we can go to the FCC and show a consolidated program of absolute usage of these channels so that they will wave the maximum of one channel. Free access means that there is one channel reserved for the city; all its needs is the equipment to program it. The same is true for public access and educational access. The cable operator must provide, in addition to this, studio space at no cost for the first 5 minutes, and most companies will provide all the time on public access that anyone wants. So free access means just that, we must provide some kind of basic studio facilities and the channel for access at all times.
- Q. If the library has video equipment, will it be able to have free access to a cable channel within the system?
- A. Yes, as a matter of fact it is desirable for the library, but it is also desirable for the cable operator to have that programming source.
- Q. Is a system required to provide a channel for the library now or by 1977?
- A. Not now, nor by 1977, will they have to do that, not as far as the libraries are concerned. Libraries will have to work out a cooperative program with the school system—at which point the educational access channel is available and would have to share the programming of that channel with the schools. But most cable communications companies will welcome the opportunity to connect you with any programming source, especially the library.
- Q. Do people using access channels control, in the case of public access, input on the access channels?

- A. The FCC has said that the cable company cannot discriminate; we must provide service on a first-come-first-serve basis to anyone, and we cannot alter or censor anything. The cable industry is asking the FCC also to preempt our liability for these channels, which they have not done up to this point. As far as municipal access is controlled, it would be done by the city. The educational channel would be programmed and controlled by the educators or the school system. Librarians are in a unique position because they would be able to program on all three access channels simultaneously. And, with the cable company's channel, there is the possibility for immediate output on four channels for information from the library.
- Q. Is the cable company liable for all output?
- A. If we are programming a channel, we are completely liable. If it is our channel and we control the information that goes out on this channel, we are liable. Theoretically, under most state laws, we are also liable for even the public access channel. If someone came in and used obscene language or slander, we theoretically would be responsible. The FCC very early told us we had to make these things available, but that they did not think there was going to be a liability problem. Our attorneys, however, told us differently. We are asking the FCC to preempt the state liability laws.
- Q. How will the recent Supreme Court ruling on pornography affect the liability?
- A. That is very subjective. I would hate to be in the position of a local manager who must judge any film or tape that might be in questionable taste. The cable operator is not the judge of public morals for any community, and I think that it would be hard for us or anyone to make a decision. There is no answer to this, and the situation is so new that we really do not have an answer for it. However, a library would be responsible for programming on a library channel, although the cable company probably shares that responsibility.
- Q. Would it alleviate the problem if the cable system operated as a common carrier?
- A. The common carrier would still have a certain amount of liability. As a common carrier he must set down certain rules and conditions so that there cannot be indiscriminatory use of that channel, and even setting down those conditions, as our attorneys tell us, still does not excuse us from being liable. There are certain broadcast functions that preclude common carrier and there are certain parts of our business that will cause us to be considered as a common carrier; how these are going to be divided and what the FCC is going to do with it is anybody's guess. This

budding industry of cable communications is controlled by the FCC, by the city or county government, or whatever school franchising authority is involved, and in many states, the state government also wants to control us. We do not object to the local regulation, we do not object to the FCC regulation, and in many cases we are even reluctantly accepting regulation on a state level, as long as it does not consider us a public utility and attempt to regulate our rates as such. This would dry up almost all of our resources at the bank.

- Q. Are there problems in gaining inter-community franchises for cable communications?
- A. We have been successful in doing that in some places. In Orange County, Florida, there was an agreement among a number of cities to go together for a franchise. Many suburban communities around the Minneapolis area, and more and more outlying areas around cities are getting together to provide a single franchise. In the Louisville area all of the surrounding communities have already said that they would be in agreement about the company awarded the franchise for the city of Louisville. In some areas of the mid-Atlantic and southern states, there is dual authority in the county between the county court and the county commissioners; if you add a couple of municipalities on top of this, agreement is very difficult. Many suburban areas are realizing the problem, and are issuing a joint franchise. Urbana-Champaign and the University of Illinois is a good example of a jointly issued franchise, and the cities of Portland and South Portland, Maine, have gone together and issued a single franchise.
- Q. Can current one-way transmission later be changed to two-way?
- A. Most of the companies are now saying that there is the capability for two-way transmission, and all they need to activate the two-way is the insertion of a separate module into each amplifier. Up until two years ago we felt that way, too. But when we tried it we found it does not work. We now feel two-way communication has to be built in from the time the system is built, or a major rebuilding will be necessary when two-way transmission is required.
- Q. Has the question of copyright for distant signals or those not originating in a particular system become an issue yet?
- A. It is very likely that when we import distant signals we are going to be required in some way to pay for them, whether that payment is called a copyright fee or not. I do not believe that we will be required to pay for the use of the local signals, since they have already been paid for through the local fee, and it seems that paying twice will not be required. I think

that the industry has resolved that we will pay copyright fees to some extent; it is just a matter of how much and by what means.

- Q. What is the library's responsibility for providing equipment which will interface with the cable company's equipment?
- A. I think any chief engineer on a cable system would be happy to provide the kind of interface equipment discussed earlier, not the cameras or the film chain, etc., but the modulator that is required to put it into the system. He would also serve as an advisor to the library for purchase of other necessary interface equipment.

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Franchising Problems and Procedures in CATV

Donald P. Mullally: I will discuss franchising—what it is and why we do it. James Keller will discuss franchising from the company's point of view and what he, as a franchise's applicant, does. Edward Douglass will discuss franchising from the public's point of view—what public bodies should be concerned with, how they should go about their business—and consider some of the public interest considerations. I think some cities do a great job and some cities do a poor job. Everyone will be able to determine what could be done in his or her location to improve the situation, or to assure themselves of a system that is going to be adequate for their needs.

A franchise is, essentially, a right granted to a company or an organization to operate a CATV system in a given location for a given period of time and usually with certain kinds of restrictions. It may be an exclusive franchise which

says only one company will be allowed to operate a CATV system in a given location for any given period of time; or it may be a nonexclusive franchise which states that at some future time the right is reserved to grant another franchise of the same sort to another competitive company.

In my personal view, CATV is inherently a monopoly situation. That may be a heretical statement because monopolies are allegedly bad; however, consider the situation of the telephone company, which is in some ways analogous. What would happen if there were two telephone companies serving a community and they were not interconnected? To talk with someone who has the other kind of telephone, two telephones would be needed in your home.

Imagine a situation in which there are two city water systems. Instead of building a pipe line down the middle of the street and connecting every home and supplying water at what would probably be a reasonable price, there would be two pipes going down the middle of the street, each one connecting every other home and charging twice as much. It seems, then, that in situations where one is attempting to deliver a service to a mass of people, there may be built into the economics of it an inherent monopoly situation. The theory is, then, that if a monopoly or a potential monopoly is allowed to exist, one ought to extract from that company certain kinds of assurances that it will operate in the public interest, convenience and necessity (to borrow a few words from the Federal Communications Act).

How can a city or other governmental agency assure itself that the company will operate in the public interest, convenience and necessity, and how can it insure itself that the company selected is the one which will do the very best job? This is essentially the whole franchising process in a nutshell. It is an attempt to assure the city government and the citizens that they are not going to be rooked for the next several years. How can this be accomplished, i.e., what are the different patterns for selecting a franchise; how do you select the company that is going to have this legal right; how should the company present itself to the community; and how can it show that it is, indeed, the company that is going to supply the best service? I think that is the topic that James Keller can best discuss because he does that all the time.

Franchising is really a romance and a platonic relationship. In the initial stages it is a courtship, an attempt to determine whether two partners—a city and a company, and the citizens as part of the deal—will ever be able to get along with each other. The question is whether one partner brings to the other services and delights necessary for a more permanent relationship to flourish. And in the second place it is to determine, if the romance succeeds, what a delight it may prove to be, and if it does not succeed, in what way the relationship can be ended. That essentially is the whole franchising process. It is an attempt to set down in some legal fashion a relationship between a company or companies and a city or group of cities and its citizens, that they can live with

for a period of years. Mr. Keller can tell us how the relationship usually begins.

James S. Keller: This was done differently a few years ago than it is currently being done. Ten or twelve years ago I could visit a community and see what they needed in terms of reception service. Within a week, I could write a franchise which I was willing to back up. Those days are gone. The cable communications industry has been integrated into the national telecommunications policy and is regulated by the FCC. Since March 1972, there are certain basic rules on the relationship between the local franchising authorities, and the FCC—certain minimums and maximums that must be met. There is now a procedure for awarding a franchise which includes a public hearing. Basically, the franchising process starts when somebody motivates the politicians to get moving. A company might be the motivator because there is a lack of communication services within the community, or any number of people in the community might be the motivators. In most cases the cable industry has become so highly visible that many more people know what can be provided, and there is an interior impetus within most communities to get a cable communications system.

What happens is that suddenly the local city or county government is faced with the decision of what to do about cable communications. Being political animals, they start looking at the local political framework in which they have to operate and compromise. They will hopefully ask themselves what expertise they have within their own city government. They may have a city manager who is very knowledgeable, who worked in a community which granted a franchise in the past and knows some of the mistakes that were made. The local government officials may appoint a committee of the council to work with a local expert in investigating the preliminary stages. From the legal standpoint, the city attorney will be brought into it. This is usually the point where things become very confusing. At this point, those locally responsible may throw up their hands and see anyone who wants to submit a proposal. An ordinance that incorporates the best parts of all submitted proposals will be put out for public hearing. After this the local body comes back and asks those that submitted bids to rebid. Most cable communications companies consider this to be blackmailing and do not like to work on this basis.

Cable communications companies would rather, at this initial stage, have the local governments hire a consultant. (There are some very knowledgeable consultants in the business.) The best way to find a good consultant is to investigate and to ask people who are interested in their local companies to suggest a consultant. Suggestions will range from the director of the cable television information center to someone on a college campus. Once a consultant is chosen, the city should ask him to put together the mechanics of warding the franchise.

The consultant will try to determine what the community interests are, and which community groups are potential users. These community elements will be invited to sit down, either as an officially appointed committee or as a self-constituted advisory committee. Either way is acceptable, as long as they work with the consultant, who must then determine what the communication needs are within the community and be realistic enough to put together an ordinance that companies will be willing to bid on. Recently some companies have been taking a different attitude toward franchising. If the city and the consultant come up with a totally unrealistic ordinance, companies simply are not going to bid.

One way to stymie broadening the communications spectrum to include services that I have tried to outline is to demand municipal ownership; another way is to make the franchise ordinance so difficult and demand so much from the companies that either no one will bid on it, or, if they do bid on it, they cannot possibly build it. To develop a system, take a step-by-step approach to finding out what the community can expect and what the consultant says you can input from a cable company. Write a realistic ordinance and then ask the consultant, along with the city committee, to submit to all the known cable companies the request for a proposal. Set down a very precise list of proposals, and ask for performance based on the financial capability of the system. Ask what the company can realistically provide over and above the terms of the ordinance. Then, when the proposals come in, have the citizens' committee and the consultant evaluate the proposals, which they should do independently, because in some cases the politicians will disagree with the consultant's evaluation. A compromise has finally to be reached, and the franchise awarded.

Mullally: How do you, as a representative of a cable company, draw up a proposal that you are going to submit to an organization? You might tell how you went about drawing up the proposal you filed in Urbana-Champaign.

Keller: Basically, I do what the consultant must do: identify the immediate and the long-range communications needs of the community, and find out what the resources are. Is there a university included? What are the elementary and secondary school systems' attitudes toward the use of television? What is the library's attitude toward the use of television? What are all the separate agencies expecting in a communications system? What is the interrelationship between the university, college, library, and city hall for this community? How do they expect their communications to evolve in the future? Having once visited with all these people, I come back and state the type of system my company can reasonably propose. We try to be honest in what we can and cannot do, and about where we will need cooperation from various organizations to do it. We will fight all the way down the line if we think that we have a chance, on

the basis of our proposal, to be awarded the franchise. If we find that our proposal is simply going to be discarded, or if we are going to be asked for additional requirements because somebody offered something else—then we will simply walk away from it.

Mullally: There are companies which do promise the sky and then never follow through. What can you, as a potential bidder, do to drive out the unrealistic bidder?

Keller: Nothing.

Mullally: To look at this from another point of view, what suggestions do you have to cities trying to handle this problem?

Douglass: The basic relationship between the CATV company and the community, at least through the franchising process, is kind of an adversary relationship. The cable company's primary interest is to provide the collection of services that will attract subscribers. The cable company, if left to its own economic devices, does not want to provide services whose costs are greater than the additional revenues that will be generated by subscribers attracted to that service. On the other hand, the community may want some services from the cable company that, at least in terms of cost analysis of that service, it is not sure it wants to provide. To put it in very simple terms, the cable company would like to make money on every service it offers. Some companies are better than others about taking the profits of some services that have been very profitable and using them to subsidize the cost of other services in order to put together a package that might have a good deal more utility for the community. The group seeking the cable services may want some things the cable company might not want to trouble itself with because of high or unknown costs.

The process of the franchising is essentially one of squeezing the bidders to get out of them the best collection of services at a given rate; this is what the negotiations are really all about. How is the community going to arrive at deciding what it is that it wants from the cable company; because if the community does not know what it wants, the cable company will largely decide for it, probably putting together a very good package of services, but not necessarily a package of services that is tailored to the needs of that community. Again it depends upon what kind of homework the cable companies do and how well it is tailored, but I think the community can perhaps ask for some things that the cable company, even though it may know the community could use them, may not choose to offer.

Therefore, the community must get its collective head together to decide what it wants. Each group in the community should examine its operation to

determine if it has any need for the cable system at all; this would include, of course, librarians—public, university, or any special librarians—who can make any use of the cable television at all. If they can make use of it, what use? In what way could the cable facilitate either what one is doing now or what one might like to do that cannot be done now because the communication facilities are unavailable?

Using a librarian as an example, the next step is to contact the CATV committee, or whatever group is running the franchise operation on behalf of the community, and persuade, argue, and convince them that it is reasonable for them to ask the cable company for the kind of services that they think are needed. Once that is done, then the negotiation process will take its course, and librarians desires will be mixed in with the desires of a lot of other individuals and groups in the community. The priorities will have to be assessed according to the politics of the community, and the outcome cannot be predicted. But if the community cannot decide what is wanted or needed, its desires may or may not fit into the public access channel; then it may have to pay for a presentation of five minutes if the cable company has a policy of charging for a presentation. That is why it is extremely important that a community, and its individual members, know what is wanted and get their foot in the door—any interested party should make his argument to the CATV committee so it can request it before the cable operator.

Mullally: The mechanical process of bringing cable television to Urbana-Champaign is an interesting one. One of the first problems that had to be faced was: Should CATV come to Urbana-Champaign? That is the question that every community faces at one time or another. There were two or three companies that said they would like to have a franchise. Should a franchise be granted to anyone? We had a series of public hearings, and the University of Illinois devoted the facility of its television station to live hearings on CATV for two nights where the general public could call in their questions. Someone on the panel or the presentation group would answer the questions or, at least, would see that the questions were directed to people who could answer them. These rather extensive hearings were held to find out what CATV could offer the communities.

After the hearings, a study group—the City CATV Committee—went into the question in some depth, and a consultant was hired. I strongly urge cities to hire consultants. It is very rare that local communities have the kind of expertise, knowledge of FCC regulations, knowledge of what the companies can provide, etc., that is needed to make a good decision. Ultimately, it was decided that a franchise should be given for CATV. The next question faced was: Which company should have it? Several proposals were sought, and eight companies supplied bids which were, in effect, rather healthy proposals. We sifted through them from several viewpoints, to see which companies had done their homework

on the community and which companies were submitting proposals in which the name Urbana-Champaign was plugged into an otherwise standard form.

We believed, and still do believe, that local control or at least part ownership is an important consideration. In most cases the cable company will attempt to get a group of local citizens to own part of the company. This can be a self-defeating method because you can have eight or nine different companies, each of them searching out all the local businessmen, community leaders and so on, and there is a great scramble for people who will subscribe to stock. So one basic question to consider is: How much of the company is locally owned, and, secondly, what kind of provisions are there in the relationship between the multiple system owner and the local group for buying stock? It is typical in these situations to have an arrangement whereby the multiple system owner can buy out some or all of the stock of the local group, usually after some specified number of years. I do not want to sound negative, cynical, or assertive about it, but it seems that, in many cases, this buy-out period begins just about the time profits begin to flow.

Keller: I might amplify this. Even if the local community owns 49 percent it does not have effective control. One of the largest factors in the awarding of the franchise in Urbana-Champaign was the fifty-fifty ownership. It is a very unusual case, and if you can get it, great, because then local people do, in fact, have a chance of voting their way if it comes down to any tough decisions. I think there are going to be many more agreements like that, rather than for a company to come in and distribute 15, 20, or 35 percent of the stock. I believe that we are going to find more and more local equity capital. Our company did not give away 50 percent of the Urbana-Champaign stock. The local Urbana-Champagne group is buying the stock dollar for dollar with us.

The local businessmen are putting up their money for 50 percent of the stock of the company that will run the system. This means \$1,000,000 in equity from the community. There will be more and more of these arrangements. In this situation, we have a simple buy-sell agreement. When one group makes an offer to buy the other, the other then has the option to either buy or sell. This provides a pretty good assurance that whichever way it goes, it is going to be in the best interest of the community. The cable company is not going to be able to arbitrarily wipe out the local group. Since we have to operate there for fifteen years, we would just as soon have their money on the table so that they are looking after their interests as well as ours. This means that we have a local board of directors whose hard money is on the line. We have a combined board making the management decision; not some distant home office. I think, contrary to what Don Mullally said, you are going to see this more and more.

Douglass: In addition, the community should examine the expertise of the company very critically, particularly if it is a wholly local operation, i.e., with no

tie-in with any national outfit. Look carefully to determine whether it is going to be able to build this system. Who is doing their engineering for them? Who is going to do the system construction? What kind of resources can they draw on in terms of management personnel? Some communities might be a little thin when it comes to these skills, and joint local and national ownership might be a stronger package in terms of expertise. Another question is whether the community has the financial resources to build the system. Multiple system owners should be scrutinized to make sure that they have not over-committed themselves in building systems and might face a credit crunch while the system is being built. Look at the experience the developer has had with other systems; send somebody to see what they are doing at systems already installed. Make sure that the company is producing the kind of quality needed on a regular basis and not hiding its presentation by some spectacular thing that it has done on a one-time basis.

Mullally: Before we took up a relationship with James Keller's company, we did quite a bit of research on what its other systems were like—how many of them were great, how many mediocre, how many poor. Whenever I heard of a bad situation in another community, I called the city manager to find out exactly what the situation was, if it was the company's fault, and if they were going to revoke the franchise. Finally, after investigating all of these questions, you have to make a decision as to which one of the applicants is the one that you want to deal with for the next few years, and then decide how many years that will be.

How many years should the franchise last? In the past, franchises were granted for as long as twenty years, and there were even a few 25-year franchises. They are getting shorter and the FCC has recommended shorter franchises—about 15 years. There are even a few 10-year franchises now. However, the franchise period must be long enough for the company to recoup its investment. In the first few years the company puts up its money and has few subscribers; you have to give the company long enough to make its investment back and a reasonable profit. Otherwise you are not going to get very good service. Some cities want contracts which stipulate that, at the end of the franchise period, the city has the right to buy back the system. That is not very appealing from the company's point of view. Why should it take all the risks at the beginning and then have somebody take away what ultimately would be their profits?

Companies may also, by the time the end of the franchise comes around, be forced, in effect, to rebuild the system. Systems are constantly being rebuilt on a bit-by-bit basis. So, a decision has finally to be made, and generally it will be made on the basis of which company a community thinks is the best one for it. Then an ordinance will be written which embodies all the terms of the proposal, any kind of regulatory mechanisms that the city has in mind, and rates.

Let us consider regulations. Basically, once the system is in, how is it made to perform? Sometimes the city's interests and the company's interests are not the same, and citizens have the fear, many times unfounded but sometimes properly founded, that the company is going to boondoggle the community and get the franchise. Many cities are building in some type of supervisory or regulatory function at the local level where they actually supervise the company's operations, and providing for some kind of complaint referral system, or an opportunity to take the company to court if certain things happen or do not happen. That is a very useful kind of thing, within reason. I think it is not within reason when the company can be subjected to lawsuits at will, or if any crackpot who feels that the picture does not look good enough is going to get the company in court. That is the kind of situation that companies will shy away from and probably not bid on.

Douglass: In considering rates, resist the temptation to take the lowest bidder, because the less money a cable company collects, the less money it has at its disposal to do anything for the community, particularly in the area of services. They have to build a system—that is specified in the contract or in the franchise. A lot of money will be chewed up in just building the physical plant, but the real value of the system is in its utilization, not in just having communication facilities. If the rate is too low, the cable operator is going to be less willing to commit himself to various kinds of services. He is going to feel that his back is against the wall—that he dare not commit himself to much of anything for fear of forcing himself into bankruptcy. There has to be some relationship between rates and services. A community might be better off taking the higher rate and getting better services, than taking the minimum rate and just getting some facilities.

Mullally: The difference between a \$5.00 rate and a \$5.25 rate for the average citizen is insignificant. To the company it is a phenomenal difference because of the thousands of subscribers. The difference in terms of the level of services that they can provide therefore will be substantial.

Keller: I recommend that, after talking with its consultants and with the most knowledgeable of their people, the city establish a rate, by ordinance, at which all of the companies then have to provide services as best they can. In this way the community has an objective scale with which to compare the kinds of services a company is going to provide for a set price. A bidding contest on rates is often not based on a realistic cost breakdown at that stage.

Cable communications companies faced a rather unusual situation in Urbana-Champaign because there were really three entities: the city of Champaign, the city of Urbana, and the University of Illinois. Fortunately the

university people knew what they were talking about. They had done all their political in-fighting before they got involved, and therefore spoke as one. They knew what basis they wanted to put the system on over the next fifteen to thirty years. They also knew approximately what they felt they could afford, and as a result they approached the companies with a reasonable package. They presented the services they wanted to be provided to the locations they wanted accessed, and asked how much it would cost. The companies had a dilemma: to provide the services they wanted at a rate they could afford, and yet make the rate to the university fully compensatory, otherwise the people of Urbana-Champaign would feel that they were subsidizing the university system. For all the services that we are going to be providing the University of Illinois, both internally and externally, we feel we have a rate that we cannot make a profit on, but which will provide us with a test market within the university and for the services that are going to be provided at the university and in Urbana-Champaign.

Mullally: I hope the company does make a profit because if it does not, we are in trouble. We are not interested in forcing the company to the wall, because we realize that if we do, the services will be minimal. A cable communications company does have to do a lot of homework on what they can afford to give or sell and at what cost. The potential user must consider what can be done with those services. Why ask for the moon if you do not intend to go there? There have been several cases in which educational groups have demanded thirty channels dedicated to education, 200 portapacks, 43 billion videotape machines, etc. If the company gave these things to people, they would not know what to do with them. Production is very difficult, time-consuming, and expensive.

When I set up the kind of operation that we were working with—the negotiation process with the company—I needed to know a lot of things that I did not know, so I called on other expertise. I asked the vice-chancellor of the university for a staff of experts: an engineering consultant (we hired one), and help in analyzing the financial statements and performance of the various companies (the university hired a law firm which knows the FCC law, and which deals with cable television regulation all the time). It has become a team approach: we have local people who understand local needs, people who can supervise the administration of the system, people who can do the negotiations with the company, and people who can write a contract. We also have engineering consultants, financial consultants and external legal consultants who can keep us plugged in to what is happening elsewhere.

Keller: The national intent of the existing communications monopoly is no longer to defeat cable television or cable communications, because it

recognizes the inevitable. What it wants to do is to delay the process as long as possible. The executive director of the Nebraska Broadcasting Association, when asked by a county commission: "Sir, how long do you think we should study this issue?" answered "Not over ninety years." Unfortunately, what is occurring right now is that many of the groups who are potential users of cable are trying to design the toaster before they have the basic electricity system. So much is being made of all the issues that are currently in vogue about cable television that the politicians are becoming confused; and any time a politician becomes confused, he does not do anything. As a result, systems are simply not being built. What interested groups—the American Civil Liberties Union, the League of Women Voters, etc.—are doing is being used, inadvertently perhaps, by the existing communications monopolies to confuse the issue so that a franchise is never granted. I urge interested individuals and communities to study the issues and get input to their politicians, but on a timely and reasonable basis. Try to be concrete rather than to show everything that you someday hope to get out of the cable system.

AUDIENCE QUESTIONS

- Q. How do you rewrite the franchise that has been "grandfathered" over a period of years? (A system franchised before the current rules were adopted, and allowed to retain its old mode of operation is said to be "grandfathered."—Ed.)

Mullally: I think a lot has to do with the relationship of the community to the operator in that community. If an operator has been doing his job to the best of his ability, he will be willing to sit down and negotiate a new covenance of the existing franchise. The FCC has taken this into its purview and has required the systems in the top 100 market to meet the communications standards, technical aspects of programming, etc., by 1977, and has left the process open so that all systems, whether they are the top 100 market or not, must have their franchises certified by 1977. This opens the door for negotiation with existing cable companies to achieve new certification. As long as the system is going to have to be rebuilt to comply with the existing regulations by 1977, it is going to cost the cable operator a lot of money. He might be very willing to listen to the renegotiation of the contract, perhaps at a higher subscription rate. The point is that both parties are likely to agree to open up the contract for renegotiation or, at least, to sign a new franchise or a new contract. The operator can use additional revenues, and the community can use additional services.

Douglass: I am, in general, against the regulation of rates of cable systems along the same lines that utilities are typically regulated. The way telephone companies and electric utilities have had their rates regulated is just all

wrong. There are very few incentives for efficiency in that system of regulation.

- Q. Is there really a community interest in cable other than better reception of current offerings?

Keller: People of the community are generally totally apathetic about the advent of cable services. In fact, we usually have to go out and ask for input. This is particularly evident in some of the states where all franchises have to go to referendum. One of the reasons we have difficulty in getting a majority in a referendum is that so few voters come out for the election. To answer the question, there is much apathy, even though all of us connected with communications recognize the potential uses of cable television and cable communications.

For instance, franchises are often defeated in a referendum by such statements as: "If cable television comes, free television is going to go off the air." "We won't be able to get anything else." "If you hang those cables up there on those poles, it's going to suck all the signals out of the air and we won't be able to get any reception." "If cable television comes, everybody in the community is going to have to pay for it. I'm a senior citizen living on a fixed income, and I do not want it, and there is no way in the world that I'm going to allow it." "It is not private capital that's needed there at all, but there is going to be another hidden tax on everyone."

Comment: To combat apathy, librarians could make a bibliography of materials available on cable use and financing in their own libraries, or materials available on interlibrary loan. Books should not all be from the National Association of Broadcasters or the Cable Operators Association. Get material from both of them and from other sources, too.

- Q. How will poor people and elderly people on a fixed income be served by cable television?

Keller: Our company likes to set up community information centers or study centers in senior citizens homes or settlement houses or any one of a number of locations where the service can be installed. Those people who wish to use the service would be welcome to do so at no cost. In some cases we will set a special lower rate for all multiple dwelling units using public funds—publicly supported housing units for the poor or for the elderly. I do not anticipate, nor would I ever want to be paid by welfare for cable communications services, although I believe that there is going to be a day when some of the services we are going to be able to provide—e.g., in public health, diagnosis or health education for the poor—could possibly be subsidized by some agency.

Mullally: I would disagree with that. It seems that we have come a long way in terms of the kinds of things we believe are necessities. There was a time when books were for the rich; we now believe that books are for everyone. We make them available at relatively low cost—in fact, we make them available free on a loan basis to the whole community—and this service is subsidized by the taxpayers. We believe that people should have a certain standard of living, and if they cannot for some reason, we have a welfare system which helps to bring them to that minimal standard of living. For many years we did not allow people who had welfare to have telephones. Suddenly, somebody decided that a telephone is not a luxury in this kind of society—it is a necessity. If cable television is going to do all the things that we want it to do, and if it is going to deliver on the promises that the companies seem to imply, then maybe it, too, will someday become a necessity and be sufficiently important for its educational and social value alone and be at least partially subsidized by the welfare system.

- Q. You mentioned before that, along with the FCC and the local government, state government has input concerning franchising. Please expand on that.

Keller: There are a number of states that have gotten into the regulation of cable television. They use basically one of two methods of regulation. One method is the control by the public service commission or the public utilities commission which controls the cable operator as a public utility—Nevada and Connecticut, I believe, are the notable examples of public service or public utility type of control. Other states have used a separate cable commission, in which they set up an entirely separate body from the public utilities commission. New York, New Jersey, Massachusetts and Minnesota are examples of this method. What they are doing, in effect, is regulating the regulators. They are putting a third-tier of regulation on the industry—one that ultimately is going to be financed by taxpayers.

Of the two methods of regulation, the one preferable to the cable operator is the separate cable commission. We are finding now that people are getting appointed to the commission who are broadcasters, educators, newspaper owners, radio station owners, etc. It is almost analogous to the NAACP regulating the Ku Klux Klan. In any event, it is regulation by people who have an ax to grind that operators feel is not acceptable. In fact, many of the state regulation agencies have precluded anyone from serving on that commission who has any knowledge of cable television at all. We resent this. We have been working at the federal level for FCC pre-emption of all state control, and I believe that the issues will be faced by the FCC very shortly. I feel the three-tiered regulation is in total confusion and works with total inefficiency.

Mullally: The state of Illinois attempted to exercise jurisdiction over CATV through the Illinois Commerce Commission, and the Illinois Commerce Commission has been told by the state Supreme Court that it has no jurisdiction over CATV in Illinois as the Commerce Act is now written. Illinois has, then, a two-tiered system of federal and local regulations.

- Q. There has been discussion of issuing of new franchises. What happens when an initial franchise runs out and it comes time to consider renewal? Would this be approached differently from the issuance of a completely new franchise?

Mullally: There is no difference at all. If the company has been doing its job, renewal should not be too difficult. If they have not been doing the job, the negotiations are going to be very difficult—even to the point where the city may want to ask for new bids.

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CATV as a Medium for Information Access INFORMATION

While defining terms with which everyone is familiar may be boring, I will define *information* because I feel that some librarians do not believe in information, but only in the containers in which information comes; sometimes these are books, sometimes something else. Bear this in mind: I believe that librarians should deal with information, not containers. Information is a series of facts—a datum, a picture, something quite static. Nothing happens to information until it is used, communicated, or transmitted. As this communication process takes place, as this picture or this fact is read, heard, or seen, something happens to the person receiving it. If he can relate the information to something he already knows, learning takes place. To complicate the picture, he may react emotionally, as well as intellectually, to the information. If an archconservative person finds out that one of his most deeply held beliefs has been thoroughly debunked, he will probably be angry. If you see a picture of a dead person, or a small baby in its mother's arms, or you hear a beautiful song, you will also react emotionally. Songs and paintings are information, because they convey a message when viewed, sent, or heard.

Information, then, is something static that, when received by someone, evokes an intellectual or emotional response and, when related to previous knowledge, may result in learning.

Cable Communications

Cable television, per se, is not an information medium; it is simply a highway down which information can be sent. So we need to think of video and data as information, and cable as a transmission medium. Yet cable is as exciting as video, perhaps more so.

Cable has some unique characteristics, including an abundance of channels, being essentially a local medium, and being a two-way, participatory medium.

The number of channels available makes communication with small audiences possible for the first time. The originator or the receiver may be a club meeting, a senior citizens' group, or people wishing to learn china painting, macrame or Chinese. Through CATV these people are together electronically, over distance.

It is a *local* medium; hopefully, the community has some amount of control over some channels and can use them for expressing community concerns. "Community" in this sense means not only geographic, but also "interest community" as described above. If the churches want to use a channel they can, and so can other local groups with a mission or a message.

Cable is interactive and participatory—participatory in the sense that these same groups can and will create their own material to send over a channel; they can elicit feedback at first by letter and telephone, later by the cable itself. When a computer is connected, individuals and groups can interact not only with each other but with the computer for all the uses mentioned above.

Thus cable is a very different medium, and one of the most exciting new ways of bringing people together and making them more aware of much information to which they have no access at present.

Sources and Use

It is clear that cable can carry information of great variety, and it can elicit response and learning from a great many people and groups. The next questions are: Information for what purpose, and information in what form?

People obtain information from their own memory; from resources around the house, such as books, magazines, television, radio; from friends and neighbors; and from colleagues and professional associations. And, some few, from libraries.

The purposes for which people obtain information are:

1. survival or daily coping with problems,
2. self-fulfillment or recreation,
3. informal learning with no crediting in mind,
4. formal credit-oriented learning, and

5. keeping up with or changing jobs (specialists, professionals, etc.).

These are the same reasons why people create information.

LIBRARIES

And the Nonuser

What might be the role of libraries vis-à-vis cable television? What can they do with it that they never could before?

If librarians believe that they should reach most or all of their clientele, then cable presents a unique opportunity to do so. Librarians have not, despite their most valiant efforts, reached more than one-third of their potential users, mostly because they think "library=books," and many potential users do not need books. Efforts to branch out into other areas, such as films and audio cassettes, have been successful in some places but are usually limited by lack of space to show visual materials, lack of equipment to loan, and lack of knowledge on the public's part that libraries have these things. Thus, with an investment of much money, libraries have reached relatively few people.

Cable permits libraries to reach many people who would never think of going to the library, and—more importantly—who are just not print oriented. These people obtain most information from visual media and are quite satisfied with this. Librarians can reach these people provided that—and I want to emphasize this—they accept cable as a way to reach people to bring them information and *not only* to lure them into the library.

To clarify this statement, the library's motive in cablecasting should be to disseminate information to people—just that. Commercial messages should not say: "This was brought to you through the courtesy of your library, which asks you to come and get a good book," but instead: "This is another way for you to obtain services from your library, which believes that you should get information any way you want to." Librarians must believe, in using cable, that information in any form is good, even electronic information, and that the people have a right to that kind of information just as much as to books and journals. Once we can accept this, we will have taken a giant step toward providing information in its truest sense, and it will help us to define what kinds of services lend themselves to cable.

On the Cable

Let us now examine some services which will provide access to information, and which might legitimately be provided by the library. We can categorize these services by the kind of information need which they help to fulfill.

SURVIVAL OR DAILY COPING INFORMATION

This is the day-to-day information need of everyone: how to have an abandoned car towed away, how to find the best insurance for an automobile, how to discover whether there is a tenants' association to aid a battle with the landlord, how to make out a will, how to fill out a tax return—all these types of needs are presently being met inadequately because existing organizations are splintered, the information is rarely pooled and it is difficult to get it to the people who need it. It is the kind of information the library has not traditionally been concerned with. Recently information and referral centers have emerged, both inside and outside the library, along with crisis intervention and drop-in centers. The *Peoples' Yellow Pages* is another attempt to reach people with this information. This is where the library can play a major role as a catalyst and switching center. While I am not suggesting that libraries get into the social service business themselves, I am strongly advocating that they help other agencies do a better job by bringing information about them to the people.

And what better way is there then through television to reach people who will not come to the library, who may not have a telephone, and who do not know where to turn? They watch television most of the time to get information and entertainment. Some doubt that they will watch a directory service, but I believe they will if they discover that problems they have may be solved this way. These are usually immediate, urgent needs, and people try to find solutions. Medical, legal, consumer, and other citizen information is vital; we can help to collect it, keep it updated, index it properly and make it available. Several libraries are maintaining a card file and, of these, a number are planning to put it on cable when they have an operational system. If libraries do nothing else, I feel that this is one of the best uses to which they can put cable.

SELF-FULFILLMENT AND RECREATION

While there has recently been a decline in recreational reading in the library, it is still one of its functions, and perhaps, at least for public libraries, one of its most traditional ones. Libraries have provided works of fiction, books on art, music, gardening, needlepoint, etc.; they have offered assistance to readers in finding the best mystery and the best western; and they have held poetry readings, film showings and concerts.

What has not been done is the bringing of those books and events to the nonusers. Now libraries can capture these events and materials with video and transmit them by cable. Many of us can remember missing something because we were too tired, had to go somewhere else, or had a last-minute crisis which kept us from going. How many times did we think, as we attended an event, how nice it would have been if some people who would enjoy it could have come, or could have known about it. Now there is a way—attend by video. The

library can tape programs, and they can be played back on the cable system, not once but several times to insure that those who missed it the first time may have another chance.

This becomes increasingly important as the size of our respective communities increases; the larger the city, the harder it is to learn what is going on, and the more difficult it is to get around, especially at night when many people are afraid to go out.

Moreover, we can bring to people via video-cable not only ballet, art shows, musical groups, ping pong tournaments and Elks Club picnics, but also interviews and discussions. These interviews could be with people who know a great deal of local history, for example. Some libraries have had oral history projects for some time; adding the visual element can enhance local history stories, can show a person in his home with family heirlooms, photographs of past events, and other memorabilia. Libraries can thus create visual history, surely one of their functions.

Videotaping groups can result in some very moving things; Larry Molumby from the Public Library of the District of Columbia taped a group of women discussing the demise of a local hospital. He did this quite routinely, not knowing what to expect. What emerged was one of the most moving tapes I have ever watched; the women, mostly Black and undereducated, described with great eloquence their feelings toward the sisters of that hospital, and what the sisters had meant to the women.

Marceelee Gralapp of the Boulder Public Library (Colorado) tapes city council and other public meetings, and shows them in her library on a cassette unit. People are coming to watch in considerable numbers with almost no promotion on the part of the library.

Also in the recreation/self-fulfillment category, there is the exciting new project mounted by the Public Television Library in Bloomington, Indiana, entitled "Have You Watched a Book Today?" A one-year experimental project was launched, making available to five public libraries the 150 best public broadcasting programs, plus local programs from the educational television stations in towns where the libraries are located. I visited the Jackson Municipal Library (Mississippi) one week after the program was launched and found people literally standing in line to watch the two monitors. About 180 people had watched during the first week. A careful evaluation at the end of the year will help to decide if this is a good way to make the excellent public broadcasting system programs and local educational television programming more widely available.

Librarians will, of course, tape anything going on in the library, such as story hours, puppet shows, forums, film showings and book talks. When an event is taped, it takes little time and trouble, and it can be replayed for those who could not attend.

Finally, and still on the subject of self-fulfillment and entertainment, let us not forget a rich source of material for cablecasting: the product of those people who have discovered video as a new art form, or as a means of self-expression. Video groups have sprung up everywhere; while some of their material is perhaps of interest only to the people who made it, a great deal of it is of wider interest. Libraries need to establish relationships with those groups and find out what is available. They are anxious to have their work stored and disseminated; librarians can help them.

INFORMAL LEARNING OUTSIDE THE CLASSROOM

The public library espoused the name "people's university" in the 1930s. More recently, there has been a great increase of this kind of use as people are stimulated by television and other information sources to want to know more about many things—not to work toward any kind of formal credit, but just to learn more about something that interests them. Most people have more leisure than they used to, and they develop more hobbies and interests. These interests may include such varied topics as china painting, environmental tests of air and water, or mushroom hunting.

The library has met some of these needs with materials, and certainly with many programming efforts. I saw people learning to embroider in a branch of the Kern County Library (Bakersfield, California), and in that same library I saw a sixth-grade video club making its own tapes, which were later cablecast. Subjects of the tapes ranged from Dracula to an interview about current events, including Watergate and high prices. They were remarkable tapes, technically well done and interesting in content.

The Denver Public Library plans to videotape a Mexican festival the library mounted in September 1973, including demonstrations of pottery, needlecraft, poetry readings, art shows, musical offerings, folk dancing, and Mexican history. Although Denver does not have cable as yet, these tapes can be shown in the library now; a program bank is being formed for future cablecasting. Denver's non-Spanish-speaking citizens may understand a little more about the joys and sorrows of their Spanish-American neighbors.

The recent introduction into several libraries of a program of informal learning for adults is very exciting. Carefully planned to begin with a thorough retraining of librarians to orient them toward learning styles of adults, and to provide counseling and communications skills, the program will result in a people-oriented library activity designed to treat each information request as a potential learning experience, which it is if librarians accept the definitions of "information" and "learning" as outlined above. Cable can play an extremely important part in this type of learning, in which the world is conceived of as the "campus," the learning environment. Foreign lands, museums, factories, anything too remote for the learner to reach can be brought to him. The Denver

Public Library's fancifully titled program of "Catalytic Synchronisms" is a beginning in this type of learning experience. How would it be if the learner was sent to "see" with a portable videotape recorder and camera, to make a tape as he was learning, to describe his learning process, so that this experience could be available to the next person interested in learning something about the subject? Here the learner would be sharing his learning *process*—something extremely important for someone else to watch who may be hesitant about his ability to learn a particular subject. This might become one of the more important applications of video to this program. Of course, the various products can be shown over cable in a program dedicated to informal learning, to stimulate others.

Also in this category is the video reference service which is operational in Natrona County Public Library (Casper, Wyoming) and Mobile Public Library (Alabama), and planned by others. Here is the philosophy of "information of all kinds and in all forms from the library" at its best. When something cannot be described over the telephone and the client cannot come in, it is shown over cable because that is the only way to bring client and information together. The concept is so simple and so inexpensive that any library can try it, provided the staff is convinced that this is "good" information.

FORMAL LEARNING OUTSIDE THE CLASSROOM

Educational and instructional television are, of course, the pioneers in this field. Courses have been given over educational television for some time, and over commercial stations to a lesser extent. Usually there was only one channel available. The same thing can be done via cable by educational institutions using many channels. At Oregon State University (Corvallis), two cable channels are being programmed exclusively by the university and 8,500 students are watching courses by cable. The educational achievement is the same, but students like it much better, since they can watch at home when it is convenient. One channel is scheduled with televised instruction all day long, the other carries special cablecasts of sports events and other happenings on the campus, and also allows on-demand scheduling for classes missed by students on the other channel. And the cable operator is happy; he has picked up hundreds of customers from the student body. People in town are happy; they can watch classes free and learn whatever is offered. At Washington State University (Pullman), a similar activity is operated by the library's audiovisual department; three cameras are rigged to a simple switcher built into the professor's desk so that he can do his own camera work while delivering his lecture—something he vastly prefers to dealing with technicians, it is said.

Libraries can act as CLEP (College Level Equivalency Program) centers, and several are doing this. When they provide information about courses of study, they could also provide video courses, either in the library or over cable. I am not advocating that libraries get into the education business in a formal

way, but I do think that they can collect videotapes or cassettes containing appropriate lectures from colleges, and disseminate them. Care must be taken here to work closely with the colleges, so that there is no duplication and libraries do not tread on their territory. But many gaps will appear in their offerings; libraries which are CLEP centers will discover these and can make sure that they are filled from commercial or educational sources elsewhere, always with the advice of educators, of course.

Moreover, libraries can, just as in the informal learning situation, encourage the production of tapes by the students themselves, which then become part of the instructional package for a particular topic. School media centers, as well as academic libraries, are in an ideal position to become the central repository and dissemination agent for tapes produced for courses, which can then be made available to others, as well as for video courses from their parent institutions. As yet, I have not seen many libraries which do that.

SPECIALIST OR CAREER EDUCATION TO IMPROVE WORK PERFORMANCE OR PURSUE RESEARCH

Many people today are pursuing their second or third career, others are trying to keep up with new developments in their fields, and still others are pursuing research of various kinds. Much of the above applies to these people, too. Material in video form, covering highly specialized areas, has been found to enhance the learning of new concepts and the understanding of difficult ones, or concepts not easily learned by reading or listening. Examples might be drawn from such diverse fields as technician training, where repairs are taught and it is necessary to see close-ups of parts to be repaired and to learn how to handle delicate tools, or medical training where a patient may be viewed by video, or an operation can be watched by many, rather than the few who can crowd around the operating table.

For the visual arts, such as filmmaking, painting, sculpture, as well as for ballet, speech therapy, engineering, drawing and blueprint reading, video can vastly enhance learning. The library will want to collect materials for career education and for specialist uses; librarians should know what is available, and where it may be obtained. Visual materials suitable for career and specialist education are available from a number of commercial sources as well as from many colleges and universities. I learned last summer that the California State College system, for example, has put together a software catalog, divided geographically, and thus has a ready-made reservoir for cablecasting as well as for in-house use.

The specialist and the researcher are the ones who will need the data communications capability which cable provides. Here the least has been done, and yet the promise is great. Applications such as PLATO IV provide an ideal means to interconnect users directly to a highly responsive and multifaceted computer-based information service. I am aware of only one project presently underway,

located in upper New York, where a group of public library systems are studying the possibility of interconnecting cable systems for information transfer, including data and facsimile of hard copies. Digitized microfiche is another promising development; there is a device at the Battelle Memorial Institute (Columbus, Ohio) which consists of a cathode ray tube terminal and a carousel-like storage medium containing microfiche, which could be retrieved automatically and shown on a television screen. The only problem is that the device, made by Digital Information Systems in Minneapolis, costs \$20,000! Computer-stored full text, until now too expensive to convert and store, is becoming available now; e.g., Aspen Systems has converted a large body of law into machine-readable form, which is then searched using a natural language.

Printed material is often typeset from magnetic tapes which can be stored and retrieved using very high volume storage devices. These memories are becoming less expensive every year, and we are moving rapidly toward the day when machine-stored information is economically feasible for ownership by library networks and the larger libraries themselves. Access languages are becoming more responsive to users, and protocols for communication between network nodes are being developed. Thus we have the building blocks we need: machine-stored information at a reasonable price, ways to access this information, and methods for interconnecting ourselves. No one has put it all together yet, but the day surely is not far off when this will happen.

Cable on a given campus or in a given city can provide multiple access points for such information retrieval systems, and can interconnect libraries of different types within a given franchise area, as well as data processing service bureaus or institutional computer centers. Moreover, it can tie business and industrial firms into the library's network where they may access certain parts of its machine-based information store directly. Imagine the day when each major city will have something like the information utility Sackman and Boehm describe,¹ in which will reside all types of public information, from books and journals to consumer information and census data, from self-instructional packages for learning to directory services such as "who knows what," as well as the library catalog. Each user who can afford this will pay a few dollars each month for an alphanumeric terminal tied to his television set, which will function as a CRT and display information on command. None of this is blue sky: the technology exists today (a terminal of the type needed is to be had for \$1,195), as do the data bases and the programs to make them work, but no one (to my knowledge) has put it all together.

Another possibility for CATV is two-way video. Teleconferencing is possible now: a conference call is placed and several people can talk to one another without being at the same place. Add the visual element and there is a situation in which one may stay at home to attend a conference, instead of spending a great deal of time and money to attend it. Personnel can be trained in new

skills; and specialists can be in touch with one another to learn what each is working on—surely a form of information exchange which should be facilitated by librarians, and one they have not easily been able to do before.

Problems

I have painted a rosy picture of our future with cable; let me now describe some problems which stand in the way of achieving all I have discussed.

TO PROGRAM OR NOT TO PROGRAM?

While some librarians do not think they should get into programming in a formal way, this does not seem to be a question for many. In fact, most of them are perhaps too much into programming. What is meant by programming, and what is the alternative? Most librarians know that $\frac{1}{2}$ inch videotape portable equipment is easy to operate and quite mobile, requiring one or two people, a camera, a video rover or deck, and no other special equipment. In creating material for the library's information bank, there are three alternatives:

1. The library can send people out with portable equipment to tape a cultural event, a festival, etc. It requires being there to tape it, and it may require some editing afterwards to tighten it up before presenting it to an audience consisting of either individuals or small groups in the library, or over cable. This is all; relatively little time is spent, and even less preparation.
2. Programming is a scripted, staged production, with extra cameras, lights, several people involved in preparation, production and editing, and quite a bit of additional equipment beyond that described, such as switching gear, a mixing console, etc. Here there is greater cost for equipment (a portable outfit can be purchased for less than \$2,000, while a minimal studio costs at least \$10,000). While someone else's studio (such as the cable operator's or the school's) may be used, people from the initiator's staff will still be involved in preparation, scripting, getting the material ready, working with participants, rehearsals, etc. The cost of this is quite high.
3. The third alternative is, of course, buying or borrowing software from sources outside the library, or having other people make program material for the library such as the Port Washington Public Library (New York) has done.

How should libraries choose between, or combine, these methods? It depends, of course, on their budgets and, more importantly, on what they want to do with video-cable and what they see its role to be.

A librarian can build a bank of tapes for cablecasting or use in her or his library just by taping, or causing others to tape, events in the community and in

the library. Whatever is going on deemed of interest to people other than those who came is taped, ranging from library story hours, panels, forums and cultural events, to speakers before the Rotary Club, mental health workers describing their services, talks by public officials, ballet, community meetings of all types, etc. If your library is a video access center and you train community people in the use of the equipment and check it out to them, they then become producers of materials for the library, which are stored and checked out for cablecasting, as well as transferred to cassette for permanent storage and replay within the building.

If community people participate in the creation of materials, librarians will find that they get tapes centered around issues, man-in-the-street tapes, interviews, etc., something like holding a mirror up to the community. There will also be tapes from people who see video as a new art form, and some beautiful things will be produced. These tapes should be stored, listed and made available just like any other library material. This is a relatively inexpensive way to obtain material and it is the librarian's role to identify events worth taping and see that someone does so.

The other extreme for libraries is the idea that everything created by the library must be of professional, high quality. There is insistence on personnel trained in television production techniques, scripting and careful planning. And the equipment is often quite sophisticated. The fear is that people will not watch a simple tape, that it has to be "produced" and in color in order to compete with commercial television. Both of these positions are justified under certain conditions. But it also appears that if the information provided by the programs is such that it cannot be obtained any other way, and is of the kind needed by the group for whom it is prepared, then a slick production is not necessary. The people who are concerned with the subject will watch. And we are *not* interested in a mass audience anyway, believing as we do that cable is a highly personal, small audience, local medium.

If, on the other hand, the material is of the kind that is trying to sell something, such as in the Tulsa City-County Library System and the Boulder Public Library, where the libraries have been awarded the governmental channel, are building and equipping a studio, and will be selling municipal information to the people, then the presentation has to be fairly interesting and slick to attract viewers who will definitely need to be won over. We will have to create a different mind set among the people, and accustom them to watching something about the sewer or welfare department rather than "All in the Family"—we are competing here, for presumably the presentation will not have a clearly defined target group but may be geared more to the entire city population. Again, it will depend on the message and how it is presented.

In between is what may be called semiproductions, such as taping a ballet performance. This requires a bit more planning and set-up and a little more equipment than an interview.

Finally, there is another problem we need to come to grips with. What about all those tapes made by many groups everywhere? Who will store them, catalog them, list them centrally, and loan them? The answer should be obvious: just as we do this with books and journals, so we should do this with tapes. There is presently a great need to know what is available in the way of software, who has it, and under what conditions it can be loaned; we need to establish a method to do this.

THE TECHNOLOGY—WHAT IS FEASIBLE NOW?

While most librarians are intrigued by video-cable, there is little information available on what the technology really allows right now. Starting at the most basic level, the tape itself, there are:

1. *Time Base Correctors:* There are sometimes problems in cablecasting $\frac{1}{2}$ inch videotapes because of their sometimes poor quality. Unfortunately, flaws do not become evident until tapes are cablecast; they may be perfectly all right when played back on the videotape recorder. There is now a marvelous group of devices called signal rebuilders, the best of which is the Time Base Corrector. It actually rebuilds the picture, makes it stronger, sharper, and eliminates wavy lines and roll-up pictures. Libraries should insist that their cable operator buy one of these, not just for themselves but for anyone else making $\frac{1}{2}$ inch tapes.
2. *Lack of Standardization:* We all know about the incompatibility of different sizes of videotapes. While $\frac{1}{2}$ inch equipment is now, thanks to the Japanese, on the EIAJ (Electronics Industry Association—Japan) standard, this is not true for other tapes, and the equipment to play them on is often not compatible. And $\frac{1}{2}$, 1, and 2 inch tapes do not talk to each other, nor do $\frac{3}{4}$ inch cassettes, which are being marketed aggressively and are therefore becoming the standard cassette format. I am concerned about this; librarians must at the very least buy $\frac{1}{2}$ inch equipment and $\frac{3}{4}$ inch playback units if they want their in-house video service to be self-service. Open-reel threading is just not very practical for patron use.
3. *Two-way Capability:* Many librarians dream of the day when information and the full text of documents can be sent over the wire, but that day is not very close, I am afraid. While the FCC requires two-way capabilities in the 100 major markets now, this is only for new systems, and it is only capability. That means the cable has to have the ability to transmit two-way, but not the hardware to do it with. Also, that two-way is merely a subscriber response system, in which the viewer simply indicates "yes" or "no," and no other communication is possible. Telephone does better than that now, and that is what some libraries are using, for example, Mobile and Natrona County Public Libraries where telephone communication is

maintained with the patron while his question is answered. Installing terminals for more than this is too expensive at the moment and not yet feasible for libraries.

4. *Frame Grabber:* The ability to transmit an individual frame of information, e.g., the page of a book, and hold it for an individual until he reads it requires a frame grabber, another device not yet available at a price people can afford. And microfiche still cannot easily and cheaply be transmitted directly from a computer-indexed store. Facsimile is possible, but fraught with all the old problems: unit cost per page is too high, resolution poor, and there is no machine which will copy from bound volumes.
5. *Digital Transmission:* While cable books are full of promises, I do not know of anyone, except perhaps Donald Bitzer, who has seriously considered tying a machine-readable data base into a cable system. There are plans but none are yet operational. While the promise is greater than the performance at the moment, let us not be discouraged; all these things are possible—if not now, a little later—and we have to be alert and experiment with them when they become possible.

WHO PAYS?

The problem of financing cable activities in libraries is a severe one. There is a variety of approaches to finding money: in some cases libraries have looked seriously at what they were doing, have studied their role vis-à-vis the community and have decided that money would be put into video equipment and staff for video-cable activities because it seemed a promising way to reach nonusers. They have reordered their priorities to make the use of cable technology a high-order item. Others have been successful in receiving revenue-sharing funds—money from city and county agencies—to provide a service to these agencies by becoming the cablecasting center for them; and a few have been able to obtain grants. It appears that commitment on the part of the library to video-cable will result in some money being set aside. As in everything else, we have to be careful not to go in all directions at once but to carefully delineate what is wanted, and then sell our package to the appropriate funding agencies.

THE COPYRIGHT PROBLEM

The copyright problem deserves to be mentioned once again. There are no clear guidelines concerning taping off the air, copying tapes, or using printed materials for cablecasting. Some people have been very careful about writing for permission, only to find that publishers and software producers are as confused as they are. Others are merrily taping anything in sight until the issue is clarified. It appears that the movement is toward purchasing with license to copy. Several school districts have concluded successful agreements with software producers

where they paid a one-time fee and were then free to copy or cablecast. That is what might be expected and should be prepared for. Taping off the air may fall under the rule schools have, where a one-time playback within a week after air time is permissible. Meanwhile, the copyright bill is bogged down in Congress, with little hope that anything will be clarified, or that it will pass.

I believe libraries have a legitimate role to play in the use of cable. Libraries have as their main function that of information storage and retrieval; presumably they know how to acquire, organize and disseminate information better than others; and information in video form is as legitimate for them as printed information. Libraries serve individuals and small groups, rather than mass audiences; so does cable if it is used correctly. Libraries have an obligation to preserve the record of man's knowledge, thus they must deal with the visual record as well as other kinds. And finally, libraries have a unique role in their various communities; they are relatively neutral, and can thus act as a clearing-house, a switching center, a catalyst for visual information as well as that which they have always handled. Cable can be a means toward helping citizens achieve a sense of participation in national and local affairs; it can be a medium for increased information access, self-fulfillment, and enrichment. It is a library's obligation to do what is necessary to help bring about better access to this medium, as well as to make sure that its clients are served, via cable, with all types of information.

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Potentials of Interactive Cable Television

The Promise of Interactive Television

New forms and imaginative uses of telecommunications can make contributions of fundamental importance to meeting and solving nearly every major problem of urban society and urban life. The report recently issued by the Committee on Telecommunications of the National Academy of Engineering, whose membership is widely representative of government, industry, and national civic groups, states:

Our cities have many problems in urgent need of solutions. City governments have a requirement for closer communications with their citizens and readier response to citizen needs. City schools are less than satisfactory in providing quality education to the nation's youth. Medical care is inadequate for the cities' poorer and older citizens. Individualized transportation is clogging the streets and polluting the air. Public transportation is often inefficient and unattractive to its users. Law enforcement agencies have difficulty in coping with a growing crime rate.

The Committee believes that modern communications technology, thoughtfully applied, can help in relieving many of these problems and in upgrading the level of city life. This conviction has been further confirmed as a result of the Committee's in-depth study of city operations, and a continuing exchange of ideas with officials in a cross-section of U.S. cities.¹

Interest in telecommunications as an increasingly powerful tool for dealing with urban problems is now worldwide. A telecommunications study made by

the Canadian Department of Communications says: "Multiservice telecommunications systems can provide not only means of developing new life patterns for city dwellers, but also solutions to many of the ills of urban living. Through the planned use of such systems, urban dwellers will be able to enjoy ordered, well-defined, and harmonious surroundings. They will have the opportunity of participating in society in a manner never before possible."²

In these and other studies, interactive television, delivered via cable systems, is a coming communications medium that could have particularly high social value. Urban planners, social scientists and historians are increasingly concerned that one-way television communications may be adding to, rather than ameliorating, basic problems of our society.

A second source of increasing interest in interactive television stems from its potential for performing functions and delivering services that cannot be provided by one-way communications and that offer great promise for ameliorating problems caused by growing urbanization. These services might enable better access to education, wider and better dissemination of health care, direct access to a wide range of information through computer hook-ups, delivery of specialized visual material to the home when the subscriber wishes to see it, facsimile printing of material in the home, and greater participation of urban population in civic life through polling and direct interaction with political leaders.

Interactive television, built on the existing, highly refined television technology in which American citizens have already invested over \$20 billion, has been developed to the point of public demonstration.³ By coupling home television sets on cable systems to computers, interactive television is ready for studies, experiments and demonstrations leading to the fulfillment of its potential. By early 1975, the MITRE Corporation will install the first full-scale experimental implementation of interactive television in an American city.

Sackman and Boehm⁴ point out the great promise of interactive television, especially when combined with video cassettes, computer information systems, and communications satellites, which they call the total "information utility." They see as a leading potential for this nationwide information its capability to reduce the unit cost of education and to increase productivity in the knowledge industry. Not only would the capacity of the individual instructor be enhanced, but educational institutions would be aided to meet the important challenges of equality of access to educational opportunity and open enrollment in universities, life-long learning, the need for periodic (or continuous) retraining accommodated to the individual on a flexible schedule in the home or office, and diversity of curriculum content to meet demands for relevance and variety.

Interactive television can supplement classroom or televised lectures through delivery of computer-assisted instruction (CAI) into a home environment, thus allowing for more efficient use of educational facilities and teacher time, as well as allowing the student to access the CAI material at the time most appropriate for him.

Education is a leading use, but by no means the only use of interactive television delivered to the home. Municipal services, polling and voting, tele-shopping, entertainment, news, person-to-person communication and banking services are but a few of the ultimate services which interactive television will deliver into the home. Many of the potential noncommercial uses have been demonstrated over the past two years in Reston, Virginia and I will illustrate some of these below.

The Problem of Interactive Television

Discussions of the future of cable television often present glowing pictures of potential two-way communications services on cable. Extensive lists of potential services have been compiled. Commercial services, such as security alarm monitoring, remote shopping, and computer-to-computer data transmission are often cited as important to the economic success of cable television in cities. It is also recognized that noncommercial services, such as interactive educational television in the home and direct citizen feedback on local political issues, would be of great public benefit. Impressed with these possibilities, the FCC has recently ruled that all new cable systems installed in the 100 largest U.S. television markets must have a two-way transmission capability, although such capability need not be immediately activated.

As is often the case with emerging technologies, the promise of two-way services on cable has, at times, been oversold. Although most proposed new services are technically feasible, many may not be economically feasible. Others can probably best be accommodated on the telephone network or by other means. Some may not be desirable at all. I would like to stress that the value to society of, and the commercial demand for various new cable services is unknown at the present time.

Actually, the near-future capital investment per subscriber to provide the delivered technology system for providing this vast potential array of services is smaller than that currently invested in the U.S. telephone system (investment is approximately \$1,000 per telephone, although incremental costs to the system are in the \$1,200 per telephone range). Thus, a most tempting set of commercial opportunities exists on the horizon. Most people knowledgeable in communications, academia, government, and commerce see mass utilization of two-way CATV as an eventual certainty.

Because of the present lack of any market tests of these services, not only is the investment community reluctant to support expansion in this area, but governmental planners—from municipal to federal, from educational specialists to telecommunication regulators—are also reluctant to initiate programs without information on citizen response to this new media. It seems probable that such uses as credit card validation and point-of-sale terminals (leading toward the

cashless society) in the next three years will develop information on the market for commercial services. Some, including the MITRE Corporation, believe the same should be done for the noncommercial services, to investigate options such as interactive educational television for the home.

Overview of MITRE's Program in Interactive Television

Since 1968, MITRE has been actively developing a computer system called TICCIT (Time-shared, Interactive, Computer-Controlled Information Television). Through the coupling of commercial television and advanced computer technology, MITRE has attempted to open new areas for cost-effective utilization, with emphasis on computer-assisted instruction.

A milestone was reached in July, 1971 when the country's first interactive television system was demonstrated in a Reston, Virginia home by MITRE. This system connected standard television receivers in a few homes and schools in Reston to MITRE's computer system via the Reston cable television system. A demonstration of a great variety of potential interactive services has been demonstrated to government and industry leaders during the following years.

In December, 1971 the National Science Foundation awarded a grant to MITRE to study the technical and economic considerations attendant on the home delivery of formal instruction and other educational services via interactive cable television. The emphasis was on the problems associated with the development of an interactive television system serving several thousand subscribers.

During the two years since the original grant award, the cable television industry has undergone significant evolution. Briefly, CATV has developed from a relay system for over-the-air television stations into a system capable of delivering a wide variety of services into the home.

New technology has opened up the opportunity to deliver thirty channels or more of television pictures. Two-way cable experiments are developing new commercial and noncommercial uses for CATV. Federal regulations have allowed the expansion of cable television into the United States' largest cities, where other services than over-the-air television delivery are needed in order to achieve high subscriber penetration. Among the services being experimented with in the cities are premium or "pay" television, local program origination, commercial services and interactive television. What services will increase CATV subscribership remains to be seen, but there is little doubt that the next few years will see a considerable diversification of services delivered by cable television.

MITRE's Interactive System

The MITRE Interactive System consists of two minicomputers, plus other peripheral equipment, connected to the headend of a two-way cable television system. The computer is capable of receiving commands from as many as 100

separate users simultaneously and of delivering individualized television pictures of written material in seven colors, full-color pictures and videotapes. Only a twelve- or sixteen-button keyboard is required in the home, although a standard CATV converter must also be used on most systems to receive the full complement of channels. Those persons using certain CAI material, which requires responses in more than sixteen characters, will have a full typewriter keyboard. If a system is installed to serve several thousand persons in a major urban environment, limitations in cable channel availability will require frame grabber devices in the home as well. Such devices will "grab" and hold a single picture at the home television set as long as desired, freeing the cable to transmit fifty-nine other pictures or frames of information each second to fifty-nine other homes.

The user's commands are transmitted to the computer from the keyboard via the cable system's return channel. Alternatively in communities without a two-way cable installation, touchtone telephones can provide the return link, in which case no additional equipment need be installed in the home.

Although only 100 persons can use the MITRE computer system simultaneously, many times this number may access the data base over a period of one day. If each user stays on the system for one-half hour per day, 2,000 such users may interact with the computer over a ten-hour day. The ultimate number to be given access is completely speculative until we are able to measure usage patterns.

Demonstration Services

The demonstration which MITRE gave to Reston, Virginia for more than two years illustrated some of the services which interactive television will deliver into a community. Figures 1 and 2 illustrate the general categories of noncommercial information available. The demonstration data base is keyed to Reston, but in urban use, material will be written by and for the community. The material will also be expanded many times over and will be continuously updated.

Instruction

Each of the nine instructional subject menus calls up one or more sets of instruction and/or information of greater or lesser extent and complexity. Samples have been implemented to represent a broad range of practicable possibilities. The gamut of capabilities decisively demonstrates the system's versatility and adaptability.

As a communication medium, interactive television is substantially independent of instructional strategy and approach. The instructional functions include:

RESTON INDEX	
PRESS	FOR
1#	INSTRUCTION
2#	COMMUNITY SERVICES
3#	HEALTH SERVICES
4#	AUTHORING AND EDITING
5#	USER DIRECTIONS

Fig. 1. Master Index.

1. information retrieval
2. data retrieval
3. calculation
4. temporary and permanent data storage
5. straight information presentation
6. question-and-answer didactic frames
7. multivariate simulation
 - a. single-student
 - b. multiple-student
8. testing
9. response evaluation
10. performance recording and reporting
11. remedial sequencing
12. motivational feedback
13. administrative directions
14. controllable timing and pacing

The media mix includes:

1. alphanumeric and graphic visual frames
2. linear audio
3. video and audio
4. simultaneous and sequential mix of 1-3

MASTER RESTON INDEX

1# INSTRUCTION

INSTRUCTION

- 1# STUDIES FOR GED EXAM
- 2# MATH
- 3# FOREIGN LANGUAGES
- 4# READING
- 5# ENGLISH
- 6# SCIENCE
- 7# CAREER STUDIES
- 8# CONSUMER EDUCATION
- 9# INFORMATION

2# COMMUNITY SERVICES

COMMUNITY SERVICES

- 1# EMERGENCY NOTICES
- 2# RESTON ORGANIZATIONS
- 3# COMMUNITY OMBUDSMAN
- 4# RECREATION AND GAMES
- 5# SUBSCRIBER-AUTHORED MATERIAL
- 6# HOME CALCULATOR
- 7# VIDEOTAPE LIBRARY
- 8# COMMUNITY BULLETIN BOARD

3# HEALTH SERVICES

HEALTH SERVICES

- 1# FIRST AID EMERGENCY CARE GUIDE
- 2# HEALTH TIPS
- 3# SEASONAL ILLNESS AIDS
- 4# DOCTOR'S DIRECTORY
- 5# COUNTY/LOCAL HEALTH AGENCIES/CLINICS/HOSPITALS
- 6# HEALTH EDUCATION PROGRAMS
- 7# INTERACTIVE MEDICAL OUTPATIENT
- 8# PARAMEDICAL SYSTEMS REVIEW

4# AUTHORIZING AND EDITING

AUTHORIZING AND EDITING

- 1# REVIEW AN EXISTING PAGE
- 2# CREATE A NEW PAGE FILE
- 3# EDIT/UPDATE AN EXISTING PAGE FILE
- 4# REVIEW AN EXISTING ACTION FILE
- 5# CREATE/EDIT AN ACTION FILE

5# USER DIRECTIONS

USER INSTRUCTIONS

(DIRECTIONS FOR "PAGING" BACK AND FORTH, FOR CANCELLING ERRONEOUS ENTRIES, FOR EXITING, AND TELEPHONE NUMBER TO CALL IN CASE OF TROUBLE.)

Fig. 2. Services Indexes Reached from Master (Reston) Index.

Potential curricular and administrative contents are, for practical purposes, unlimited. The array of subjects is only suggestive, including coverage of preschool through adult achievement levels in mathematics, language arts, consumer education, sciences, and career studies.

These curricular materials are often accessible from the community and health services menus, which, in turn, contain still other instructional programs which can be reached directly from within the instructional index. Whenever pertinent, branching is enabled from one curricular sequence to a different but related set of information, services or instruction.

The General Educational Development preparation both informs the student of the local requirements for obtaining a high school equivalency diploma and gives drill and practice of the type of question that can be expected on the examination. MITRE's demonstration program in spelling prevents the student from moving on to the next set of problems until he answers all questions correctly in the previous set.

Similarly, in elementary school math the computer will give the student the correct response after two wrong answers. If the student fails to give the right answer the third time, the sequence stops and a message is flashed on the screen requiring the student to get human help (see figure 3a). Other illustrated mathematical services utilize the computer's calculating ability (see figures 3b-e).

Foreign language instruction is accomplished with a mix of visual and auditory presentation. Paired English words and phonetic transliterations of their foreign equivalent appear on the screen (see figure 4a). An FM channel is automatically selected and assigned, with instructions to the learner for tuning (see figure 4b). Once started, the student coordinates the rate of frame change with the touchtone keyboard, and can stop and start the linear audio accompaniment to match his own pace. Complementary foreign-language videotapes also have been indexed and can be accessed on demand. Specimen materials have been assembled to demonstrate various kinds of instruction in five languages (see figure 4c).

Other demonstrated instructional uses include speed reading, where the lines disappear at timed intervals according to reading speed (see figure 5); various types of videotaped and interactive scientific material; career and consumer education and guidance; and information regarding local college courses of instruction, adult and open university courses.

Community and Health Services

TICCIT was designed as a delivery system for computer-assisted instruction. Interactive television, an extended application of the TICCIT concept, is a full-scale information utility. It is clear from the demonstration that interactive television is capable of supplying individualized instruction and administration not only in schools, but in cabled homes as well.

An extraordinary feature of the system as a communications medium is that it opens the way beyond institutional barriers to interaction on demand with a dispersed and immensely broadened population of learners. The same

WHAT IS THE SUM OF 73+98

156 TRY AGAIN.

139 SORRY, YOUR ANSWER IS INCORRECT.
THE CORRECT ANSWER IS 171.
NOW ENTER THE CORRECT ANSWER.

111 PLEASE SEE YOUR TEACHER FOR HELP.

TEACHER: WHEN YOU FEEL YOUR STUDENT'S
READY, ENTER THE CODE TO BEGIN AGAIN

A

TABLE OF LAND MEASURE TRIVIA	
TO IMPRESS YOUR FRIENDS WITH	
.92 INCHES	= 1 LINK
100 LINKS	= 1 CHAIN
80 CHAINS	= 1 MILE
1 FURLONG	= 220 YARDS
8 FURLONGS	= 1 MILE
5.5 YARDS	= 1 ROD
30.25 SQ. YDS	= 1 SQ. ROD
160 SQ. RODS	= 1 ACRE
640 ACRES	= 1 SQ. MILE
3 MILES	= 1 LEAGUE
6 SQ. MILES	= 1 TOWNSHIP

R

METRIC EQUIVALENTS			
PRESS	FOR	ENTER NUMBER	ANSWER
1#	INCHES	# _____	MTRS
2#	FEET	_____	MTRS
3#	YARDS	_____	MTRS
4#	MILES	_____	KMTRS
5#	PINTS	_____	LITERS
6#	QUARTS	_____	LITERS
7#	GALS.	_____	LITERS
8#	OZ.	_____	GRMS
9#	LBS.	_____	GRMS
10#	TONS	_____	KGRMS

0

DECIMAL EQUIVALENTS	
GIVE FRACTION	ANSWER
NUMERATOR #	<u> </u>
= <u> </u>	
DENOMINATOR #	<u> </u>

D

INSTRUCTIONS	
CODE	FUNCTION
*1	ADD
*2	SUBTRACT
*3	MULTIPLY
*4	DIVIDE
*5	SQUARE ROOT
*6	RAISE TO POWER
*71	ENTER \$N.NN MODE
*72	LEAVE \$ MODE
*8	DELETE LAST LINE
*90	CLEAR ALL LINES
**	IGNORE THIS ENTRY
*99	FINISHED

E

Fig. 3. Sample Math Instruction Information and Calculation Frames.

computing and communications power, further, make a natural medium for the delivery of interactive community and health services beyond the instructional services described so far.

The range and mix of possible community services and instructional offerings is demonstrated by "Hypothetical Scenario of the use of Interactive

MANDARIN CHINESE - PLEASE LISTEN
AND REPEAT THE FOLLOWING.

ONE	YEE
TWO	UR
THREE	SAN
FOUR	SE
FIVE	WOO
SIX	LIOU
SEVEN	CHEE
EIGHT	BA
NINE	JIOU
TEN	SHR

*9# TO CONTINUE

A

CONVERSA-PHONE MANDARIN CHINESE

TUNE TO 106.7 ON YOUR FM DIAL&SELECT:

LESSONS 1-14	1#
LESSONS 15-20	2#
NUMBERS, DATES, SEASONS	3#

B

FOREIGN LANGUAGE INSTRUCTION

SPANISH	1#
FRENCH	2#
GERMAN	3#
MANDARIN CHINESE	4#
RUSSIAN	5#

IF YOU WANT INSTRUCTION IN ANOTHER
LANGUAGE, WRITE TO:

THE MITRE CORPORATION
WESTGATE RESEARCH PARK
MCLEAN, VA. 22101

C

Fig. 4. Sample Foreign Language Instruction Frames.

SPEED READING

MOST EDUCATED, UNTRAINED READERS
HAVE LITTLE TROUBLE MOVING
ALONG AT 200 TO 400 WORDS PER
MINUTE. WOMEN, ON THE AVERAGE,
READ SOMEWHAT FASTER THAN MEN.
THIS TEXT IS RUNNING AT ABOUT
250 WORDS PER MINUTE. TO FIND OUT
YOUR OWN APPROXIMATE READING
RATE, PRESS 1# WHEN THE
TEXT STOPS. THE RATE WILL
INCREASE. KEEP GOING
UNTIL YOU CAN'T KEEP UP.

Fig. 5. Speed Reading Frame.

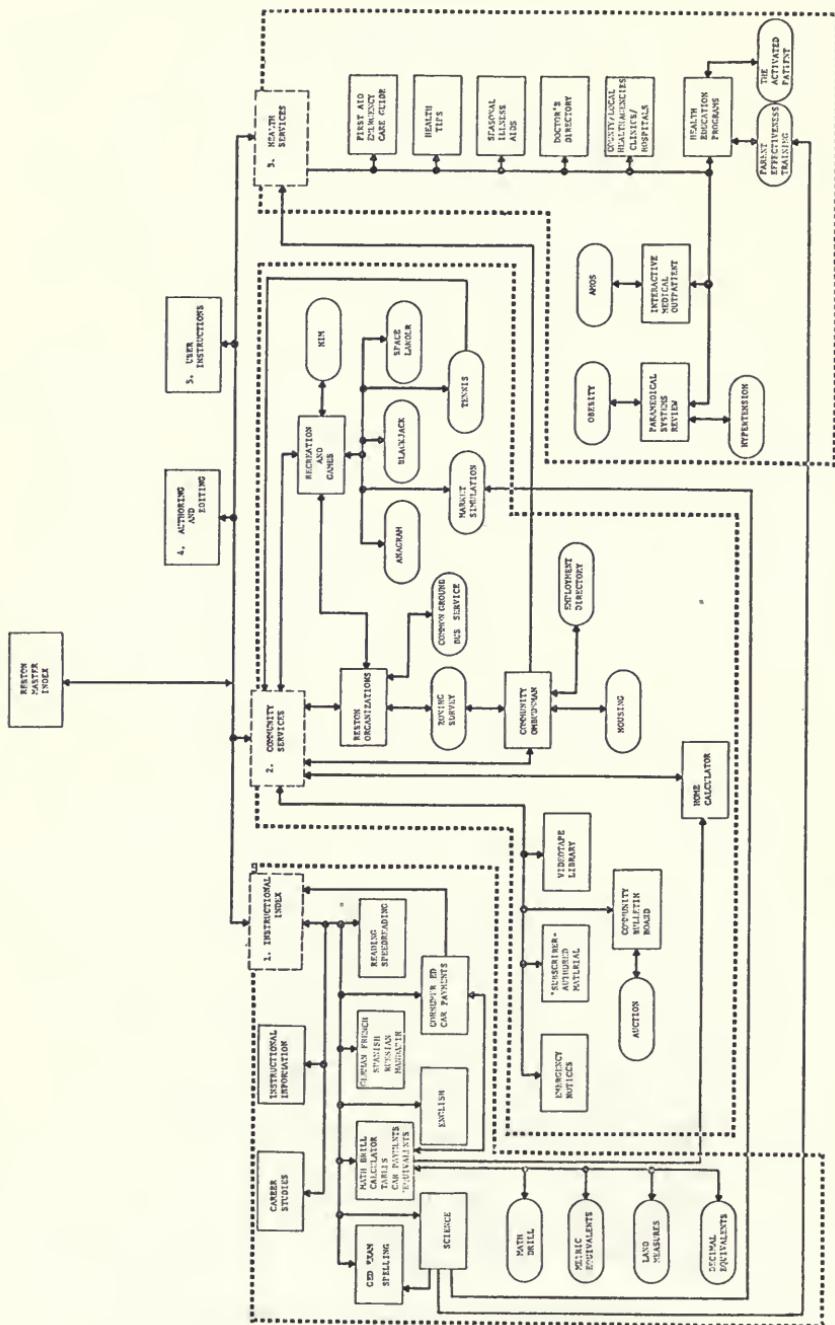


Fig. 6. Interactive Television Demonstration.

Television by One Family" (Appendix A). Working illustrations of many of the services, including actual data and reference to real activities, are part of the interactive demonstration schematized in figure 6. A viewer can, with remarkable ease:

1. learn about Reston community organizations, services and activities;
2. participate in an auction, which features half-tone color photos of items for sale, and computer recording of bids entered;
3. vote in a public zoning opinion survey, and review tabulated results;
4. enter personal requirements, and receive a computer-matched list of employment opportunities or of housing available;
5. select a starting point and destination on the Reston minibus route and receive an instantaneous display of departure and arrival times for buses between the two points;
6. query the computer for available tennis courts, and record a reservation at a specific court and time;
7. play a variety of games with the computer as opponent, including black-jack, NIM, and anagrams;
8. access information about medical services available, and make an appointment to see a physician;
9. go through an interactive, computer-guided diagnostic routine designed for paramedics; and
10. review and study instructional material for laymen, paramedics and medics on first aid, health maintenance, illness prevention, and treatment.

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APPENDIX A
HYPOTHETICAL SCENARIO OF THE USE OF INTERACTIVE
TELEVISION BY ONE FAMILY

Charlie Lewis is a "do-it-yourselfer." He needs to build a new wing for his house and wants to handle every detail himself. He draws up plans and is about to order material when he realizes that some level of government must approve his plans. Charlie dials into the computer and turns on his television set to the channel assigned him. In the menu he finds a "Housing" category. By pressing appropriate buttons on his touchtone telephone, he successively accesses "Construction" and "Plan Approval."

The list tells him that approval is needed both from the county and the Reston Home Owners Association Architectural Board of Review. By pressing the appropriate buttons, he obtains the locations and telephone numbers of the county and Reston agencies as well as the person to call for assistance. Charlie can also view facsimiles of the appropriate forms, with pointers on supplying the needed information. Finally, he retrieves summaries of recent decisions by the Architectural Board of Review so he will know which way the Board has been deciding cases. Confident he knows the proper procedure, he obtains the proper forms and files his application.

His wife, Linda, is looking for a new and unusual recipe for fish. She takes the phone from Charlie, checks the menu on the screen, and discovers "Home-makers' Hints." Rapidly punching buttons for "Food Recipes" and "Fish," Linda obtains a list of original or borrowed recipes which her neighbors have fed into the system through volunteers operating telephone switchboards and terminal keyboards.

Linda suddenly realizes that she and Charlie are invited out for a Bridge game that evening, but have no babysitter for eight-year-old Jeffrey. Nobody has entered a listing in the "Help!" listings, so she types the Lewis' telephone number in the "Help!" section on "Babysitter Wanted—Today" and waits for the phone to ring. Having lined up the sitter, Linda gets a call that their friends are ill and the game is off. She and Charlie are disappointed, but the situation is not hopeless. Through the "Dynamic Bulletin Board" she finds the telephone number of others who need two to fill a foursome. She calls them and discovers a couple on the next block whom they have never met.

Jeffrey then enters the room and announces that he needs the television and telephone for his homework. He is taking English and a math course at Forest Edge Elementary School in Reston using the Computer-Assisted Instruction material prepared by Computer Curriculum Corporation, and he has some homework to do on-line. His identification number will allow his teacher to monitor his progress (the computer grades and records his progress in the assignment).

While dinner is cooking, the Lewis's check the current community news. Charlie checks the "Reston Today" menu and punches up the Reston Community Association (RCA). He learns that a public hearing on the proposed private hospital in Reston is scheduled for the next night. RCA wants his opinion on the hospital, its proposed location, and the projected costs of medical care if a private, rather than a public facility, were constructed in Reston. Charlie consults with his wife who indicates not only that she favors the hospital, but also that she would work on a committee and testify in favor.

The interactive system registers their opinions (the computer compiles the results) and takes Linda's telephone number, noting that she wants to work in favor of the hospital. If, instead, she opposed it, she could register for that committee as well.

During the evening, Jeffrey decides to try a game of NIM. He calls up a friend, and they play the game against each other through the computer. After a while, the friend must leave; so Jeffrey continues playing against the computer.

When his parents get home, they check local organization news, relax and listen to some music selected by touchtone from the interactive FM listings, then call it a day.

KEN DOWLIN

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Cable Television as an Information Tool

Public libraries are going through a period of great change. Historically they have provided the majority of their services to educated people; have emphasized collection development in the area of literature and history; and have been essentially a middle-class institution. For public libraries not only to survive, but to play an important role in the community, they must change their operations to reflect the idea that information is their most important product. Most libraries say that they do provide information, but few of them consider information in its fullest context. The information I refer to could be provided by one institution. Not only information needed for education and self-education, but information needed for everyday life should be provided.

Having done many home projects, I am very much aware of the information problems for these kinds of activities. For example, where does one go to find the best bonding agent for putting paneling on a cement wall? Most people ask their lumber yard, which, in many cases, knows the answer. Many public libraries have on their shelves magazines such as *Popular Mechanics* which can answer these questions, but the person needing the information immediately seldom thinks of the library as a source of this kind of information.

The public should be educated to use the library for these kinds of information. The problem in getting them to do this is two pronged. First, libraries have to convince the public to use them in this way. This takes a great deal of time and effort. In many cases this has to be done on a one-to-one basis—one staff member telling one person about the kinds of information available. The second problem, of course, is that once the public is convinced to use the library in this manner, the library must deliver. Delivery is a tougher problem than educating. The user wants to find specific information about a specific

thing, and wants it immediately. Libraries have channels for finding this kind of information. Library schools teach reference techniques. It is unfortunate, however, that reference seems to be in the areas of literature or history. With the vast proliferation of handyman and crafts magazines, it would be helpful to have some training in library schools and other traditional education to provide sources for materials in these areas.

I am continually amazed by the number of librarians who do not use their own library to find information. They all know that virtually any information is available somewhere; the main problem is locating it, then obtaining it. Inter-library loan is a tremendous tool, but it is geared for the student or professor or someone who is working on something that they have several weeks to do. Inter-library loan is not terribly effective for the person making stock investments or to one who has a piece of machinery spread into a hundred parts on the garage floor. Libraries must develop major efforts for streamlining. We need to give serious consideration to networks and how these networks can function rapidly.

There are some technologies which libraries can use to solve these problems. It will be necessary for librarians to become familiar with these technologies so that they can adapt them to their own purposes, and hence expand the capabilities of the technologies themselves in relation to library usage. There are three technologies discussed below, two of which have been used in libraries for years. I do not think any of them have ever been utilized to their fullest extent and it will probably take more time before they are.

1. The computer is generally hailed as a revolution in American life that has had or will have as large an impact as the industrial revolution. Libraries can no longer say "we can't afford them," "they don't do what we want to," or any of the other excuses that are heard. The primary reason computers have not been able to do what libraries want them to is because librarians have not applied themselves to refining them as a tool for library purposes.
2. Libraries have in many ways overlooked or only superficially looked at microfilm. Microfilm has been around for a long time. Virtually every library in the country has some type of microfilm—generally periodicals—where it is used to save space. Few libraries have used microfilm as a way of capturing source information in such a way that it can be readily utilized as part of the overall information package.
3. Cable television is being viewed, depending on one's viewpoint, as major technological revolution in this country, or as a bust. The Sloan Commission, which did an exhaustive study on cable television's implications for the future,¹ predicts that by 1980 more than 60 percent and as much as 80 percent of the homes in this country will be wired for cable. Many people feel that the commission is wildly optimistic. There is a general

consensus, however, that cable television is on the verge of becoming a major factor in our lives. The Natrona County Public Library was the first public library in the country to operate a cable television channel on a full-time basis.² I will not go into details on the background; it is sufficient to say that we are operating the channel, we have demonstrated that it can be done, and we have demonstrated that it is a tool that can be used by the library.

The Natrona County Public Library has recently received \$81,000 from the Natrona County Commissioners to design, implement, and operate a microfilm information system. The initial purpose of this system will be to convert county records to microfilm and to design the continuing system for capturing this type of information on microfilm. Many aspects of this system lend themselves readily to our "normal library operations." We will be able to use the microfilm to capture a variety of information, primarily related to our own locality. We can use it to convert the information into a standard format so that it can be handled under normal procedures. As a part of that microfilm project, we have the funds for the use of a computer (an NCR model 101) for a maximum of eight hours per day.

Hopefully, in the next one to five years, we will be able to utilize the capabilities of the cable television system, the microfilm system, our own traditional library system, and the computer to answer the informational needs of the people of the county. The system will use microfilm, or the traditional book, periodical or pamphlet file to store bulk information, or it will use videotape. The computer will be used to index all of this information to the great degree necessary to utilize it rapidly. The computer may also be used to provide limited storage for informational items which have a high frequency of usage. This type of information file will be determined by using the computer to operate our management information system, thereby predicting requests for types of information or specific items of information. The cable television system will be used to provide one of the communications links with the user. We will be able to utilize three methods to communicate with our patron: in person on the premises; via the telephone, which plays a very important role in our services; or via cable television, which will become increasingly important as we develop the methodology and the mechanics to answer questions quickly. Television also gives us the added capability of storing information in the videotape format. It may also be used to capture, at the time of occurrence, items about the community that are of an important informational nature.

Many public libraries now consider themselves information centers for the community. This is certainly a heartening trend. In order to make this concept fully effective, however, two adjectives must be added to the words "information center." Those two adjectives are "immediate" and "comprehensive." The

question is not: Can it be done?—it can be. The question is: How well can libraries do it, and what is the definition of immediate and comprehensive? I tend to use the narrowest definition possible for immediate and the broadest definition possible for comprehensive. I am optimistic that this approach provides a viable future for public libraries in America. But first it must be demonstrated to the common man and woman that libraries can and will do it.

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The Video Policy Statement

Probably the greatest obstacle to librarians becoming involved with cable technology is their own inertia and natural hesitancy to pioneer in a new field. There are many good reasons why librarians would rather wait for developments and solutions offered by others experienced in coping with cable communications. For example, unused to the interface of technology with library operations, many librarians fear being thought ignorant and also feel an insecurity resulting from a lack of experience with this newest of communications hardware. Furthermore, by dealing with community video producers, cable operators and franchising agents, the librarian must assume a role that extends beyond the normal perimeters of library service. However, certain circumstances urge immediate aggression by librarians into the development of cable television.

If libraries ever hope to use cable or video communications and attain some of the projected possibilities that have been outlined by other papers in this volume, they must become involved now, during the developmental stages of the media. The Federal Communications Commission has opened the door by allowing five years for the experimentation in the use of cable television for local community programming. Even so, in 1977 the FCC will re-evaluate the free provision of local public access, educational and local government channels, and reassess the public interest use of these channels.

As for the insecurity of being thought ignorant of the complexities of the technology or lacking the necessary expertise, one only has to talk with others, including the local cable operators, to realize how few "professionals" have had substantial experience in programming for the community. Many libraries, in fact, have found their traditional programming skills a boon for the program-poor cable operator, and yet others have learned that their interest in cable can act as a catalyst for involving other community organizations. In San Francisco

there is a natural alliance between the broadcasting expertise of the schools and universities and the cablecasting interest of the library. Additionally, most local politicians lack the necessary information concerning cable television and its potential, and in many cities officials have encouraged librarian guidance and advice. Lastly, unlike other library services which libraries can adapt to their own needs based upon other's experiences, cable communication services are designed and operated at the local municipal level, and for any significant library video development there is a necessity for a grassroots involvement of the library into the local business and political arena. A simple outline of all the problems and possibilities would be desirable, but in this highly embryonic field there are few experts, and even they possess but limited experience. Hopefully, by recounting our experience in San Francisco, others will learn some possibilities to help in their own situations. However, any effective video project will be based upon individual, personal effort.

Library administrators can be instrumental in helping to establish new directions for their libraries. "Working librarians," however, are usually left to carry out the administration's policies. In San Francisco the formula was turned around; the staff provided the energy for the establishment of the library's video policy and the administration provided a support climate of encouragement and made efforts to implement the policy. Although San Francisco Public Library does not own any video equipment and has done no cable programming, it is an institution situated in the midst of a large (30,000 subscribers) cable system.

In January 1972, prior to the FCC regulations, Mr. Anderson, then City Librarian, requested that Jim Shugart, the library's audiovisual technician, and I develop a grant proposal for an experimental cable library project to be submitted to the state library for LSCA funding. In less than one week, a proposal was sketched which, although it received enthusiastic response, did not obtain funding. However, rather than be discouraged, we resolved to plan more adequately for the next proposal and to seek alternate means of funding. We gave an orientation workshop outlining some of the potentials of cable television to the staff and asked for volunteers to help develop another project proposal. Following the meeting Anderson, in his only official address to the task force, outlined the need to operate as an ad hoc committee, and asked that a proposal be submitted by December 1972. He also requested that, rather than just develop a video project, the group should attempt to outline a long-range plan of the library's video development (one which could be integrated with the library's traditional services) in which the project would be an initial step. Therefore, even before the task force became organized, it had been given the essentials of successful staff participation: (1) a goal to be obtained—in this case, not only the formulation of a policy, but also the development of a preliminary project; (2) guidelines that illustrated what would make the policy acceptable to the administration; and (3) a time frame in which to operate.

With unprecedented enthusiasm and feeling of responsibility the twenty librarian-volunteers immediately agreed upon the priorities of getting organized, getting educated, and keeping in contact with the rest of the library staff. At the first official meeting of the "Video Task Force," a proposed organizational structure was adopted and members volunteered to join six action committees. Each action committee was given certain objectives and was headed by a designated "communicator." Each communicator was expected to keep communication flowing between the committees and cooperatively to arrange general task force meetings. As originally established, the committees were:

1. Policy and Programming—Master planning for collection development, programming and cablecasting, and outlining program priorities for implementation.
2. Research, Educational, and Public Relations—A current awareness committee to keep all members posted of developments, keep San Francisco Public Library staff informed of the task force's activities, and develop a basic collection of print materials about cable television.
3. Experimental Collection Development—Plan a core collection of pre-processed videotapes by contacting known video producers locally and nationally. Also investigate methods for videographic control (as compared with bibliographic control).
4. Political Action—Education of city officials to cable's potential, and lobby for revision of San Francisco franchise to comply with FCC regulations. (This was the only committee the city librarian joined as a member.)
5. Funding—Inquire into the possible funding sources for video projects—internal, local, state and national.
6. Business Communication—Maintain contact with the local cable operator and other business interests that might support the library program.

To be briefly critical of the task force's organization, it was not long after the committees began operation that the need became obvious for more coordination than was possible through the committee communicators. Although I served as a voluntary coordinator for the first few months, in November the library funded a temporary half-time video coordinator position. Also, when the task force's action committees were established, we were unaware of the tremendous interest which would be raised outside the library or the consequent need to keep in contact with interested segments of the community.

A community relations committee should have been established in lieu of the Business Committee and Public Relations Committee to keep in active contact with the various interested people and organizations. As it occurred, many activities fell outside the perimeters of any committee and the task force coordinator was forced to handle inquiries for information from the community

and represent the library at numerous community meetings. By the time the policy was adopted, not only had a Citizens' Cable Coalition been established, but also a Municipal Consortium and a Cable Subcommittee of the San Francisco Educational Consortium, all of which wanted the library's input. We also learned that the establishment of a funding committee was premature to the adoption of a policy statement. Organizationally it would have been better to combine the print-oriented Research Committee with the tape-oriented Experimental Collection Development Committee into a unified Video Collection Committee responsible for collecting both print materials and video catalogs.

The most surprising flaw in our organization was the initial misconception of the importance of the Political Action Committee. At first fearful of including any active political involvement, this committee was established to ask questions of City Hall and try to clarify cable regulations. Rather than being taken aback, City Hall welcomed the Political Action Committee and encouraged it to contribute suggestions for a revised cable franchise. The committee assigned itself the goal of drafting suggestions for the revision of San Francisco's franchise ordinance in accord with the policy statement. After the adoption of the policy statement this duty became the major task of the library task force. At this time, having developed a broad base of knowledge and staff encouragement, the Political Action Committee metamorphized into the Franchise Committee, and members became spokespersons before the board of supervisors. It also held a cable workshop for city officials and agencies and helped organize a Municipal Cable Consortium. With growing interest in cable communications (there had been five places of legislation introduced in one year), the library has been developing political expertise and has become a major voice in the politics of cable communications in San Francisco. As a result of the testimony before the board on behalf of the Municipal Consortium, the library was given a seat on a Citizens' Cable Television Task Force established to help advise the board on cable matters.

Despite the flaws of its initial organization, the task force began operations very smoothly and quickly. Emphasizing its second priority, an immediate program of self-education was adopted. Lacking a video coordinator in the early days, each committee held its own meeting and the communicator typed out the meeting's minutes, which were circulated to all other task force members. With the establishment of the video coordinator, these minutes were compiled into an informal newsletter entitled "Cable Coordination Report" which was distributed not only to task forces but also to every branch and subject department. To aid the flow of information, the Research, Education and Public Relations Committee made arrangements to have the main library subject departments order a separate copy of all cable materials for the task force. These materials are sent unprocessed and uncataloged to the task force's coordinator. Through special permission the task force was also given a small petty cash fund

to purchase mimeographed reports and other inexpensive documents that would not normally be ordered by the library. In turn, the committee recommended titles and acted as a resource for information about video and cable.

Everyone read and discussed the material at committee meetings. Working collectively, we were able to develop an expertise and have specialists in a matter of weeks, far sooner than would have been possible for any individual. I believe this is an important lesson for administrators who do not have to concern themselves with the infinite details of technological development, but can concentrate on the concepts and request pertinent information from others who have thoroughly investigated the field.

It was but a few weeks before task force members found that their contacts were less searches for information than a provision of answers to questions from others. This natural development of the task force's expertise and its recognition as a source of cable information for the community led it to the fourth priority: to act as a clearinghouse of information for San Francisco's Videosphere and to be aggressive in educating the rest of San Francisco to the potential of cable television.

To facilitate communication between the library and the community, especially in the early planning stages, the task force held monthly meetings to which all library staff were invited and to which special invitations to community organizations were sent. At a monthly meeting Allen Rucker of Top Value Television showed his tape of the 1972 Republican Convention in Miami and explained his use of inexpensive $\frac{1}{2}$ inch video equipment which allowed him and his crew to tape the entire convention for less money than the networks spent on coffee!

At the next meeting the Collection Development Committee featured tapes from the Video Free America cooperative, and guests included officials from the Office of Economic Opportunities. For the November meeting, the task force decided to test its draft policy statement on a broad representation of San Francisco's video community. At a crowded meeting, the City Hall franchise regulator, representatives from the cable operator, independent San Francisco video producers and librarians talked about different philosophies of video and cable development. Comments about the library policy ranged from outright enthusiasm to a local educator's comment: "you librarians should keep to the book." As a result, our activities began appearing in newspapers and magazines, not merely as news items, but as feature stories about the library's proposed new role in the electronic age.

I cannot itemize all the contacts the various task force librarians have made throughout the year but I will mention our most recent community education series of programs. Every Wednesday for nine weeks, the library held a program in nine branches. After a brief slide show that illustrated the present and potential use of cable communication, portable video equipment was

demonstrated, and then a special-interest video group was given time for a presentation. A feminist group presented a powerful tape on the psychology of rape to a group of women, an Asian group's tape compared redevelopment of Japantown to the Japanese relocation during World War II, and a gay video collective told of their community's disenfranchisement from mass media. Other video groups featured Chinese, Blacks, children's television, long-hairs, Spanish, and college students.

Surrounded by high visibility, and in an energy-charged environment of staff involvement and community support, the Policy and Programming Committee deliberated the direction of the library's video program. From the beginning it was realized that the task would be difficult. Twenty individualistic librarians with different philosophies of standard library services rarely agreed unanimously on the experimental library services. At the first meeting of the committee a fight almost broke out over which program would be best for the library:

"We should have a videotape collection of all San Francisco-produced tapes."

"Oh, should we ignore quality?"

"No, we should only purchase 'professionally' made tapes."

"What's professional? Don't you understand the whole concept of people's video?"

"The best thing we can do is produce our own tapes."

"Should we also start publishing books?"

"We should start slowly and concentrate only on collecting books and information for a central information center."

"We should stop talking and start making video, even before we get this policy statement written."

Ideas and criticisms flew in all directions. To minimize conflicts we decided to draw up individual ideas of priorities. Needless to say, no one list was the same as another. However, the areas for discussion were clarified. One task force member's list which acted as one helpful guide in fleshing out the policy statement follows:

POSSIBLE LIBRARY INVOLVEMENTS IN VIDEO/CATV (in order of increasing energy, resources, etc.)

1. Printed information about videotape-CATV
2. Videotape archive for reference
3. Videotape circulation to groups (outside the library)

3. Videotape circulation to groups (outside the library)
4. Videotape circulation to individuals (outside the library)
5. Internal programming to groups (audience viewing)
6. Internal programming to individuals (on-line closed-circuit television)
7. Production for staff (inservice training, continuing education workshops)
8. Production for public (community education, public relations, video tours of library)
9. Cooperatively shared production facility (public, education, municipal?)
10. Use of cable system (bicycled tapes)
11. Cablecasting link with cable system (microwave or wire)
12. Library-operated cablecasting facility

In terms of standard library practice the above list of priorities could read: acquisitions, storage, circulation, programming, production, and cablecasting. For each of these areas, the task force members tried to consider as many problems as could possibly be projected. Even at its conclusion, the task force considered the statement merely as a fundamental "working paper" subject to revision as experience developed. We learned that through the discussions many of our attitudes changed, and we designed the document to be flexible. However, it has given us a foundation on which to build and was an excellent tool to help clarify our thoughts and feelings. Each library will have to develop its own policy based upon the many variables of its own situation, including flexibility of the physical building, availability of a cable system, attitudes of the cable operator, other community interests, etc. However, I will briefly outline some of the major areas for evaluation and discussion of all the above priorities.

Economics—How much would this particular project cost? How would this project be more economical than another? How would the adoption of this service affect the total cost of the project? Could there be long-range savings by adopting a more expensive initial program?

Technology—Which format is the most flexible? Which format would best suit this individual program service? How sophisticated should the equipment be? What additional equipment is necessary for each service? How can some equipment serve various functions?

Practicality—Where could this project be placed: branch or main library? How much room is needed? Where could we expand? How much staff is needed for each program? for the total project? Where should equipment be stored? What security is necessary?

Library Philosophy—How would this program relate to normal library functions? What current library services could be adapted to use this new medium? What new services could be instituted? How shall the clerical and professional staff be involved? How does this affect our overall policy of library services?

Community Philosophy—Whom are we attempting to serve with this project: traditional patrons? Which presently unserved populations? Should our cablecasting focus be on public access programming? educational programming? programming for the municipal channel? How does this choice affect what we do? What effect might this project have on the library's image in the community?

In addition to the policy statement, supplemental reports were also submitted to the administration at the final presentation of the statement, including a rough budget and specific spatial and staffing recommendations.

As noted, the library's policy statement was presented at a general meeting of video people, the cable operator and a representative from City Hall. The policy was also given exposure to the rest of the library staff. Copies of the draft document were given to all library departments and branches and criticisms were solicited. We followed up all comments by explaining our position or amending the document. In January, the final draft was presented to the library's administrative council for its evaluation and revision. The major criticism of the document was its almost too comprehensive scope. However, the task force explained the need for a flexible document that could act as a long-range goal rather than short term set of objectives. Anderson asked each member of the administrative council to write detailed criticisms of the document. These comments were then given to the Policy Committee for review. At its final meeting, the Policy Committee reviewed the criticism of the administrative council and clarified those sections of the document that caused confusion. At the next session, the document was accepted by the council and referred to the library commission for adoption. On February 6, 1973, the San Francisco Library Commission adopted the Video Center Policy Statement, six months after the original presentation to the commission which outlined the task force's plans and objectives.

Task force activities have continued as we continue our boot-strap approach to the library's cable development. Fortunately not all libraries have had to expend such initial energy. In San Jose, for example, a progressive cable system, a knowledgeable city manager, a supportive library administrator and an energetic library staff have joined forces to plan a library-operated municipal channel. Once again I emphasize that the spirit and potential of any individual community will have the most telling influence upon its own library's plans and decisions. If any single library ever intends to use modern telecommunications for its information services, each of its librarians must overcome inertia and take the first step immediately.

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A Public Access Workshop

A public access workshop is a video-cable facility open and available for use to everyone in the community. The following is a description of the essential workings of such a facility based on the experiences of the Alternate Media Center in helping to set up workshops in DeKalb, Illinois; Orlando, Florida; and Reading, Pennsylvania, among others.

In these communities, with the financial help of the local cable companies, public access channels are now in operation which are completely operated by volunteers, with only one or two paid coordinators. Through the use of these facilities anyone may reserve time on the community access cable channel on a first-come-first-served basis. The workshop's equipment includes portapaks, cameras, editing decks, monitors, microphones, lights, telephones and modulators.

What is unique to these three projects, however, is the fact that these workshops each control their own public access channel, which has both live and tape capability. Their volunteers teach free classes in the use of video recorders, editing decks and cablecasting equipment. *The Access Workbook*, a complete documentation of how these centers operate, as well as a detailed analysis of the use of the particular equipment configurations, has recently been published by the Alternate Media Center at New York University School of the Arts. Therefore, what I will describe in this paper will be the vital psychological dimension involved in this new medium. Learning how to use portable television equipment is becoming increasingly easy. What remains difficult is learning how to communicate with these new technologies—learning how to use these tools to accomplish what is most needed.

The workshop members are those in the community who feel the need to share what they know, feel, or do with others in the community and who invite response from those interested. These workshops become a nutritive context in which people are able to use the new information technologies without fear and often with personal and public benefit.

The people who come into such an environment play a number of roles. A workshop member is also a fireman, a doctor, a senior citizen, a Rotarian, a waitress, a student—most likely a combination of many identities. In Florida, for instance, the term “workshop project” was coined for a particular idea or event that involves the cooperation of workshop members volunteering to work together in presenting a program or a series of programs for the channel. Those involved in a project are responsible for publicity, organization, reservation of time and equipment, and seeing that it gets on the cable, as well as encouraging feedback.

Workshop projects include, for example: city council meetings, art festivals, social service programs, children's shows, ecology projects, and community civic projects. These projects are an important aspect of the development of public access in that they increase interaction and encourage discussion between individual workshop producers. There are endless examples of this process: members of the Deaf Orlando Club met other members of the workshop during their work with the College Park Art Festival. Nick Hart, working on his library tape about the Young Adults Department, achieved the rank of Eagle Scout; he has since been helpful in the development of the Boy Scouts' City Council Project. Members of the workshop, hearing about the City Council Project, are now working on the County Charter Commission Hearings, and people who had met each other while taping the Winter Park Art Festival are now helping with the production of the Sunday Morning Children's Show.

As people interact and teach and learn from each other, the question we keep asking is: Are the people for whom the information is intended watching? Communication is at least a three-way process involving feed forward, feedback, and the context in which the interaction takes place. In the workshops the concern increasingly becomes not just the making of tapes, but learning how to use this new medium, cable, as an information system that is responsive to people's changing needs.

A successful case in point was the use of DeKalb, Illinois of the public access workshop by the League of Women Voters during the time when a school bond issue was presented to the electorate of DeKalb. The league was an advocate of the proposal. They made a number of videotapes illustrating the conditions in the schools and pointing out where the money would be spent if it were approved. On the night before the election they went on the cable “live” in order to show the tapes and to discuss the implications of the issue. They brought with them resource people, and they opened up the telephone lines for questions.

They also took care to advertise the telecast widely. The response was so overwhelming that the program, which had been scheduled to run for three hours, was extended to six hours because of the numerous specific questions being called in by the cable audience.

The workshops become a learning environment and, for all who participate, an educational system. Ivan Illich has stated that "a good educational system should have three purposes: it should provide all who want to learn with access to available resources at any time in their lives; empower all who want to share what they know to find those who want to learn it from them; and finally, furnish all who want to present an issue to the public with the opportunity to make their challenge known."¹

The questions to ask are: Can a "community library and information center," by housing a workshop facility and its capacity for cable channel origination, begin to become such an educational system? Can the library, as part of its traditional commitment to the enhancement of public communication, play a major role in the development of a complex community information system? A community-controlled workshop with broad participation under the auspices of the library could develop a new appreciation for the vital role of this institution in community life.

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CATV and Libraries: Issues and Challenges

The rise of cable television is only one of the technical manifestations of several major social changes taking place that involve the manner, the content, and the intensity of communication among people. The true challenges of cable television to librarianship can be discerned only through an understanding of these changes. It is in this context that this is written.

The first major change to be noted is the advent of the information age which is rapidly supplanting the industrial age. The information age has been spawned by society's increasing reliance on an almost overwhelming growth in the amount of data and information being generated, for varied, and often overlapping, missions. There is so much data and information that even those who generate it have trouble coping with its meaning.¹ Politics, actions, decisions of all kinds in all sectors of society are more and more sustained by information technology. In the words of a recent Conference Board report:

Advances in the storage, retrieval, processing and distribution of information make up the central technological achievements of the twentieth century's third quarter. Within two decades these new information technologies have become an indispensable part of the web that hold society together. If it had to get along without these technologies, the business life of the United States would be imperiled to the point of disaster. The new ways of handling information have brought about fundamental changes in governmental and political processes. They have altered the psychological and cultural attitudes of hundreds of millions who have only the haziest notions of how the new technology works.²

This growth is matched by the development of sophisticated electronic means for handling data and messages. Satellite communications, special purpose common carriers for digital signals, expanded modes of recording (sound, sight, and binary impulses), increasing complex computers with vastly larger memories, laser transmission and a wide variety of terminal devices are converging along with cable communications to create a virtual revolution in communication.

The second phenomenon confronting us is the change being wrought on society which introduces impermanence as its chief characteristic. Society increasingly values diversity and individual freedom to learn, to choose, and to decide. We must mobilize our information resources to serve these elements in order to cope with the shock to society that will occur as it is impacted by the instabilities of impermanence and rapid change. This is the theme of Toffler's essay on future shock.³

In education, a constantly changing society is restoring the credibility of life-long learning. Libraries are accustomed to this concept, for the notion of serving as the people's university was one of the root elements that fostered the public library movement in the nineteenth century. But the call is now for the entire community to become the people's university, and libraries will have to share the stage with other elements of society as learning resources.⁴ Life-long learning will be sustained by information gathered in many places for many missions, and made accessible through various means of communication, thus reinforcing the hold of information technology on the viability of society.

Although the focus of this institute was on only one element of new information technology, we must broaden our view at this point. It is impossible to achieve success in realizing the full potential of cable communication without understanding and accounting for the more universal influences that are brought to bear on us by these general social phenomena.

THE CHALLENGES

Self-Renewal

Librarianship's first challenge in grasping opportunities presented by the telecommunications revolution is one of self-renewal. Society's needs and information technology are quickly exceeding traditional librarianship's ability to serve as an agency for providing access to information. The library's mission must be redefined in terms relevant to today's world, and librarianship must begin to operate with a wholly new fundamental philosophy. Libraries stand very much in the same relative position to publishers and readers as they have for over a century, but the strong role of the printed page as a purveyor of information has been diluted by other media. The role of libraries has thus also been diluted.

The modern era of the library movement in the United States was fostered in the nineteenth century by a complex of causal factors including the ability of municipalities to support public information facilities economically; the rise of a feeling for historical research and the urge for conservation of documentary resources among amateur scholars; local pride; the social importance of universal public education; the self-education and Lyceum movement; and the demand for vocational training to support the new American businesses and industries. An institution was required because the principal beneficiaries—the professional classes, the tradesmen and the mechanics—could not each afford to own and keep all of the books they needed for their studies.⁵ The chief proponents of an institutional solution argued that society should tend to these needs through a public agency, hence the mission of the modern public library.

The same societal pressures for a public agency to preserve and provide access to media and the information it contains exist today. However, the social environment and the number of kinds of information resources, the modes of their access and delivery, and the urgency of need have changed drastically. Libraries can little hope to serve the social needs of the future unless they can establish new roots in an ethic that accepts the variety of media that now serve where books and newspapers once alone sufficed, that raises to priority status those services that deliver information to the home and the office, and that serves to integrate library services with those of other information agencies into unified networks for citizen information.

The issue here is simply: *Should* the library be concerned with the kinds of activities that electronics media allow? Librarianship has been uncomfortable in any role involving nonprint media. To work in the electronic environment vastly exacerbates this discomfort for, of all things, the electronic technology does little to facilitate delivery of information, messages, and signals directly from the printed page. Furthermore, we must recognize one of the chief influences of electronic communication, namely that of reorganizing space so that geographic contiguity, either of people to each other, or among people and information resources, is no longer important for communication purposes.⁶ This is a condition alien to librarianship, for in spite of our use of telephones and teletype to answer reference questions and to locate materials, our extension efforts have been chiefly limited to building branch real estate or driving mobile libraries to locations contiguous to critical masses of people. We still rely principally on people coming to us in order to contact media.

Libraries have certain general, key characteristics that make them apt agencies in supporting people's search for use of information—characteristics such as a tradition of serving all comers without intellectual discrimination and with disinterest in point of view, and accessibility at times when other parts of the institutional information structure are closed. Unfortunately, our failure to deal with the change in the communications environment engendered by the

advent of nonprint media and our indifference to a potential role as entrepreneurs in putting information and media into people's homes and on their desks tend to reduce the visibility of librarians as agents capable of capitalizing on new information technology.

There was no library profession in the nineteenth century to assay and delineate society's needs and to mold institutions and services to offer information to the community. The prime movers of the library movement then were the rich and the scholarly from other segments of society. People such as Horace Mann, Henry Barnard, George Ticknor, John Quincy Adams and John Burt Wight carried the burden of public debate and action to create the modern public library. Now there is a professional cadre with a firm lordship shielding the fundamentals of librarianship from modification by its beneficiaries. If there is to be a change in the basic mission and goals of librarianship, and a new library economy to serve them, we will have to nurture the change ourselves.

Reconstitution

Most of the material in libraries today does not interface readily with electronic communication facilities. To read books via television is slow, cumbersome, and wasteful of both manpower and channel capacity. All of the television in place now for home delivery of signals is designed for moving images. Nor are today's services in libraries designed for home delivery. Thus, for full utility, libraries face the challenge of reconstitution—the changing of the format in which information is stored in libraries, and the services to be offered from the store.

Electronic technology has already begun to force a change on us. Many traditional indexes, formerly in card and book form, are now available on magnetic tape, or in some other form of computer memory, and are accessible through interactive terminals and telecommunications systems. The Library of Congress provides cataloging information on computer tapes as well as in card and book form. Many libraries contain motion picture film versions of stories from books—a conversion of data bases that probably has never been recognized in the context used here—a reconstitution of medium for a different mode of delivery.

What kind of programming can and should be done with cable television? Most of the exciting promise of interactive cable communication is in the distant future. Someday libraries may be well-stocked with machine-readable text, perhaps in microformat, and home terminals will be widely available for the capture of text images. Project Intrex at M.I.T. has demonstrated the technology for automatically retrieving and reading microfiche on a cathode ray screen, but the equipment is still prototype, and the distance of transmission is quite short. The creation of a textual medium matched to an electronic image transmission service will require a whole new "publishing" industry, including a new economic struc-

ture to compensate the various parts of the diffusion system. This would have to be sustained by a new legal concept: an electronic copyright.

If computer-aided instruction is to take place via home video, is the library likely to be involved, or will the home base be the academic agency with its staff for the preparation of frames for programmed learning devices and of computer software? If the library is to be involved, will it have to have its own computers, or will the provision of computer services be part of the package offered by the distributor of the instructional materials?

The library seems aptly suited, according to present tradition, to the creation of archives of videotapes, and the provision of access to them. Hopefully, the library will have facilities to put tape information directly into the cable channels for distribution, and will not be relegated merely to the circulation of tapes to be played on home or local studio facilities. But, if the library is to be a node in the distribution system, will it offer material on demand, or set up an announced schedule of showings, thereby becoming another station on the dial?

Should the library be responsible for producing the tapes of local events, for more timely distribution to the potential audience? Or should this be the responsibility of the agencies whose events are being taped—or even a public “third party” agency with the talent and the equipment to make quality programs? Should this be a public function at all, competing with commercial interests for the same events? Should various public agencies bank the tapes they make themselves in the pursuit of their missions, to play into a public channel from their own offices? If so, we are faced with a difficult networking problem, either to schedule events on the channel, or to provide switching at local levels for access to the public records according to local needs. Is there a role here for the library, perhaps as the search strategy or the switching agency, or perhaps as the neighborhood substation for redistribution of material available from other agencies?

Above all, who is going to pay for this innovative programming? Here we note a serious discrepancy between need and means. Access to the kind of information, and in the manner described herein, requires sizable sums of money for planning, implementation and continuation of service. Under normal circumstances it is planned that cable subscribers will support programming in their monthly fees. But the people who might be the object of much of the information disseminated via cable by public agencies are the people least able to pay for the luxury of home delivery of the services on television. This is one of the socially troublesome issues raised by many current proposals for new cable services.⁷

Administrative Reconstruction

Pressures for interactions among agencies, as well as between agencies and their publics, will increase in the information age. The speed with which people

can access information through telecommunications and can switch from source to source will require that careful attention be paid to the reduction of organizational constraints that hinder the mobilization of any and all agencies to work on problems of mutual concern. What is required is an organizational philosophy that will encourage quick interaction, shared governance of data and information resources, and selfless acceptance of participatory interagency management. Thus, administrative reconstruction is another of our major challenges.

The information needs of society are growing and becoming more complex, and the number of agencies and the volume of data they hold are growing to match. But the current ground rules call for each agency to control the gathering, the handling and the disseminating of its own data. Indeed, it is packaged and programmed for access to meet specific missions, often disregarding the potential value of information that might be derived from the data for other agencies' missions. Information storage and retrieval techniques coupled with electronic communications networking could end this waste.

Urban communications planners are looking ahead to the time when cities will be wired for many kinds of communication, and cables will be used for a variety of kinds of communication, not just visual. The National Academy of Engineering and the MITRE Corporation have proposed several alternative grids and channel allocations for various civic, educational, public administration and other purposes.⁸

This new style of organizational relationship will be enhanced by electronics technology. Special circuits for telecommunications can be easily established by wiring and electronic switching that will in essence create "virtual" rather than real organizations. The consumer may not even be aware that information and images are coming from different physical and administrative jurisdictions. These virtual agencies can be disestablished merely by cancelling the circuit. They can exist for as long as there is a need. Any agency can serve as a node in many networks simultaneously. Telecommunications will thus facilitate the advent of the adhocracy in managing problems that Toffler notes will be a palliative to some of the effects of future shock.

The question is: Who will direct all of this effort? Who will survey this domain of data, and structure the electronic network to diffuse it? Which will be the lead agency? Where will the switching center be located? Who will map the search strategy for the unsophisticated user? Who will adjudicate jurisdictional disputes among agencies for positions of power in the networks? How will we guarantee that the information in the data bases, if they are available as public utilities, will not be used out of context for purposes contrary to the public good? How will city hall feel, for example, about having tapes of all council sessions available on call via CATV whereby they can be taped and re-taped and edited in ways that might present the administration in an adverse light? How does one safeguard against such actions short of censorship? Who

will judge the quality of data, and the aptness of them in response to various queries?

One student has proposed that it is time for a city hall communicator with background in public administration, mass communications, interpersonal communications, political science and urban planning.⁹ Although this person is viewed as a public relations officer, the difference between public and technical information will diminish for handling and packaging purposes in the information age. An unscrupulous person occupying such a powerful position could easily become a commissar of information rather than a facilitator of access for the public good.

Politicization

Finally, if librarianship is to accommodate to the information age, it faces the challenge of politicization. This term is used loosely here to refer to the process of attending to issues of law, regulation, governmental policy and politics. In the realm of telecommunications, this may be referred to as electropolitics. This is the premier challenge we face, and I list it last to feature it.

The development of all segments of the electronic communication industry, its operation, and access to its facilities are strictly bounded by laws and regulations. These in turn are molded over the long run by national telecommunications policy which is now being generated by the White House Office of Telecommunications Policy. Finally, the whole enterprise is tested against the Constitution of the United States, and particularly the First Amendment thereto.¹⁰

The electropolitical process is constantly ongoing. At national levels it takes place in the White House, the Congress, the Federal Communications Commission, and the Supreme Court. At local levels it occurs in legislatures and public utility commissions, and wherever ordinances and franchises for access to public space are formed. Money and power to control information diffusion are at stake and the proponents of various causes are strong, vocal and active. Librarians must be able to recognize and work in the corridors of power in the electropolitical process. They must negotiate vigorously for the conditions that promote communications industries that not only do not hinder our use of telecommunications facilities, but actually advocate it.

This does not mean that those who carry the burden of this electropolitical process must become professionals in law, politics, economics and utility regulation. But they must be well grounded in the processes of industrial financing and politics and the relationship of legal processes to the operation of communication businesses. Success will come through a sensitivity to all of the influences brought to bear on decision-making at all levels in this vital industry. We must not only know who we are, but also who others in the electropolitical

process *think* we are. We appear to the communications industry as an element of cost rather than income. We also speak from a position of strength as surrogates for a demanding society, although this will not stop industry from trying to operate with such finesse that its hardware will be in place and the rules established for its operation before we have had a chance to influence these matters.

The power of policy and regulation is formidable, if not absolute. CATV is a generation old, but was foreclosed from expansion until recent months by FCC regulations that made capital investments in the industry unattractive. Now CATV suffers a "broadcast hangover" in FCC regulatory practice. This, and regulations covering pricing policies for communications services that encourage long, slow depreciation write-offs for investments, prevent the rapid upgrading of old hardware, and the introduction of new technology as soon as might otherwise be feasible. Once set at any level, regulations are hard to change, and once installed, communications companies are hard to disenfranchise. Thus, it is urgent that librarianship be represented in the electropolitical process regarding any new telecommunications capabilities while the industry is forming.

The range of questions to be addressed in establishing regulation and issuing franchises is broad, and each is fraught with political and social implications that raise enormous hostilities among groups.¹¹ Answers to these questions are never straightforward or easily derivable from objective analysis. For every proposal there are advantages and disadvantages, and almost irresistible trade-offs. It is difficult to distinguish between those questions that are national and those that are of local relevance, and indeed, one of the most crucial questions is: What part of the operation of cable television should be regulated at which level of government? Local regulation seems more appropriate to insure communication facilities and programs tailored for neighborhood consumption, but the potential for incompatibility among systems to the detriment of networking, and the subversion of national goals and technological potential increases thereby.

Beyond that, questions abound, and they are right now under consideration in many places. Who should own cable—the public, or commercial interests? Should municipalities and states be allowed to tax cable system revenues? How many channels should be installed under the terms of local ordinances? To whom should the channels be allocated? Should cable systems mix both regular programming and common-carrier services? Should the regulations require programming by cable owners and allow public access, or allow programming and require public access?

One must focus here on one of the most crucial issues in electropolitics—that of copyright. There is no need to delineate the issues under deliberation regarding library copying in attempts to revise the copyright law. The problems of authors' sole control over the use of their works will without doubt be

further eroded as the public gains more means for communication. Williams and Wilkins is no less concerned about telecommunications than about copying machines, for a "soft" image of a page of one of their journals delivered on a television screen in a doctor's office appears to be no less hazardous to a publisher's economic viability than a "hard" copy delivered by mail.

The full potential impact of the new communications technology on the restructuring of the knowledge diffusion industry is unknown and unpredictable. But the fact that there will be a restructuring of the fabric of information distributions is certain. Ways will have to be found to attract the capital to build the industry, and to encourage creative people to enter their works. The best minds cannot forecast the future here, so Congress proposes to deal with the issues as they arise by creating in the copyright law provisions for a commission on technology for this purpose.

Society is rapidly moving from the industrial to the information age. One of the phenomena that characterize the new information age is the new electronics communication technology that is blossoming around us. It offers great opportunities since it frees people from the constraints of time, distance, and channel scarcity for communications purposes. Agencies that consider themselves primary in one or another aspect of information handling are faced with at least four major challenges if they wish to seize the opportunities that are becoming available to serve society.

These challenges, as stated above, are those of:

1. Self-renewal—the creation of new philosophies and principles for the definition of their roles in society;
2. Reconstitution—the creation of new media and services with which to serve society in their new roles;
3. Reconstruction—the adoption of new modes of interaction with each other, and shared governance of the information utilities available to society;
4. Politicization—the assumption of more vigorous, commanding presence in the councils where national policy, laws, regulations and their interpretation are being formed, both for a better guarantee that they will survive as agencies, and as ombudsmen for the public in the sector where they have been assigned responsibility by society for service.

These challenges are universal in dealing with all elements of communications technology: we face them immediately in the advent of cable television in libraries.

Let me close with this admonition from the Conference Board:

The next twenty years will be the critical period when the quality of our response to information technology will be disclosed. So far, none of the societies that have embraced the new information technologies seem to have a satisfactory grip on their implications or any clear sense of how they should or should not be used.

To date, this failure is neither surprising nor disgraceful. The range of possible consequences presented by the new information technologies is so varied and subtle that no society could be expected to have ready-made solutions to the main problems presented. But as the employment of these technologies continues to spread rapidly, it will be disgraceful if policy questions generated by them are not soon identified, discussed, and dealt with.¹²

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INDEX

- Access channels, 18, 19-21
- CATV: channels available, 18; community uses, 7, 60, 63; costs to subscribers, 7, 32; definition, 5; history, 5, 14; as an informational tool, 66-69; library uses, *see* Libraries; as a local medium, 39; in metropolitan areas, 17, 19, 53; in rural areas, 18
- Commercial television, 5, 6-7
- Computer-assisted instruction, 53, 56, 59, 85
- Copyright, 22-23, 50-51, 88-89
- Equipment, 23, 49-50
- Financing of CATV: public, 16; private 30
- Franchise, 22, 24-37; community's role in, 28-31; defined, 24-25; government's role in, 36-37; length of, 31; ownership, 30; politics of, 26; renegotiation of, 34
- Government regulation of CATV, 87-89
- Hardware, provided by industry, 17
- Interactive television, *see* Two-way CATV systems
- Lazers, 18
- Libraries: equipment needed for CATV programming, 47-50, 67-68; possible uses of CATV by, 8, 10, 15, 20, 40-45, 49, 66-69, 78-80; role in obtaining franchise, 29; video policy for, 71-77
- Libraries' relationship to CATV, 81-90
- MITRE Corporation's interactive television system, 55-65
- Monopoly, 16, 25
- Programming for CATV, 47-49, 70, 72, 84-85
- Public access: channels, 18, 20; studio, 6; workshop, 78-80
- Public television, 5
- Software for CATV programming, provided by industry, 17
- Transmission of CATV signals: point-to-point, 17; satellite-to-home, 19
- Two-way CATV systems, 5, 15-16, 19, 46-47, 49-50, 52-65; problems, 54-55

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